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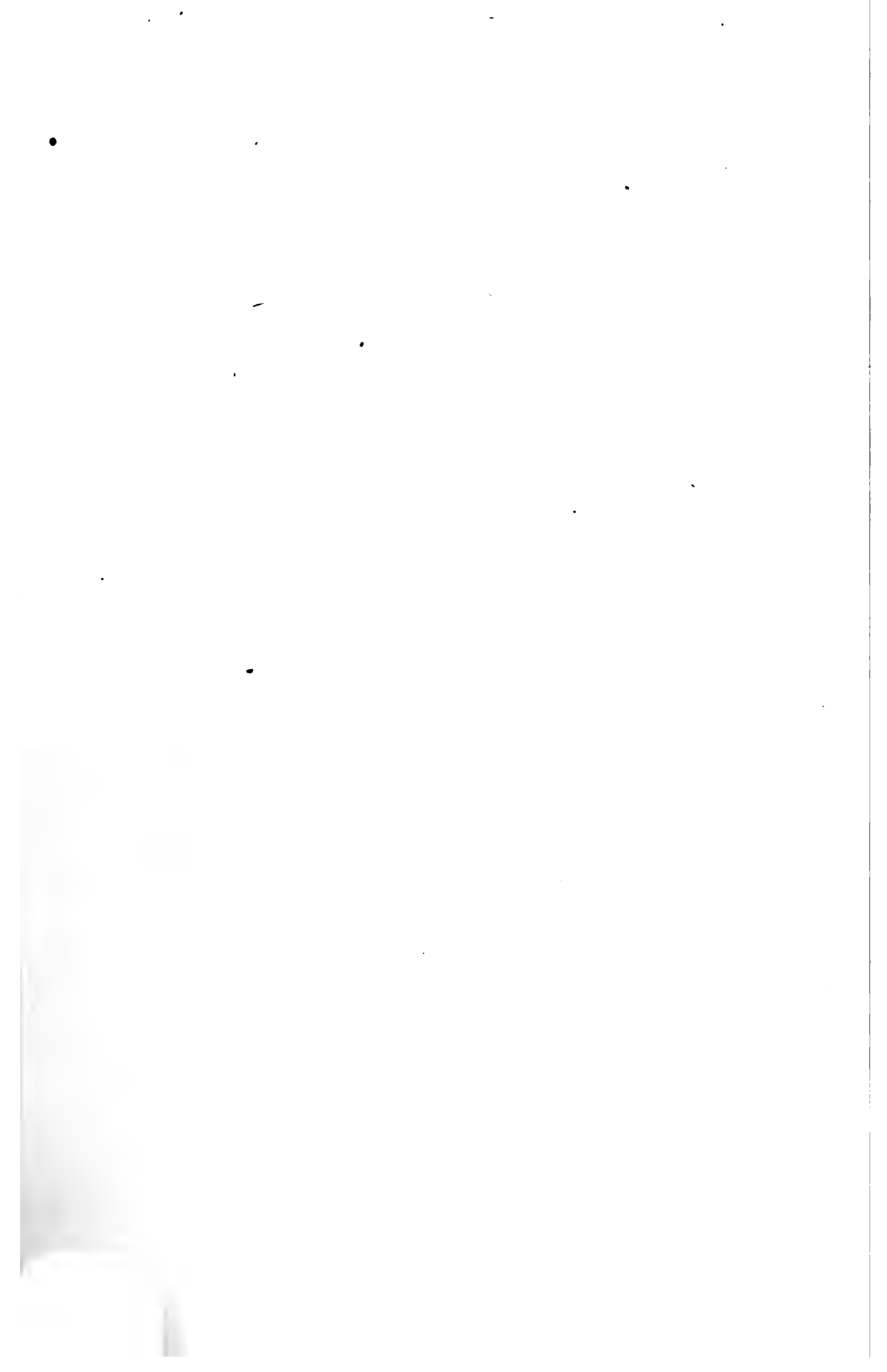
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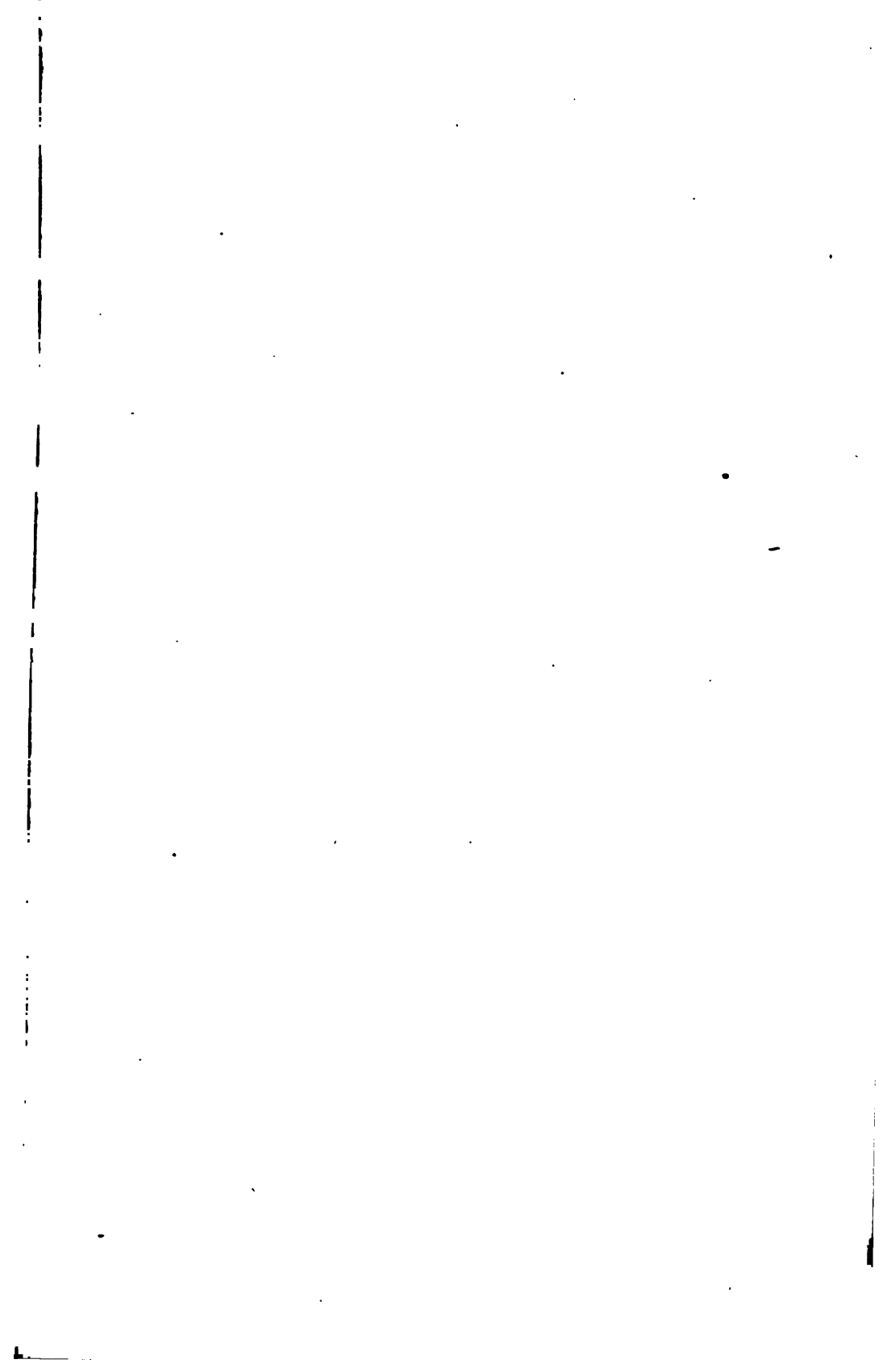
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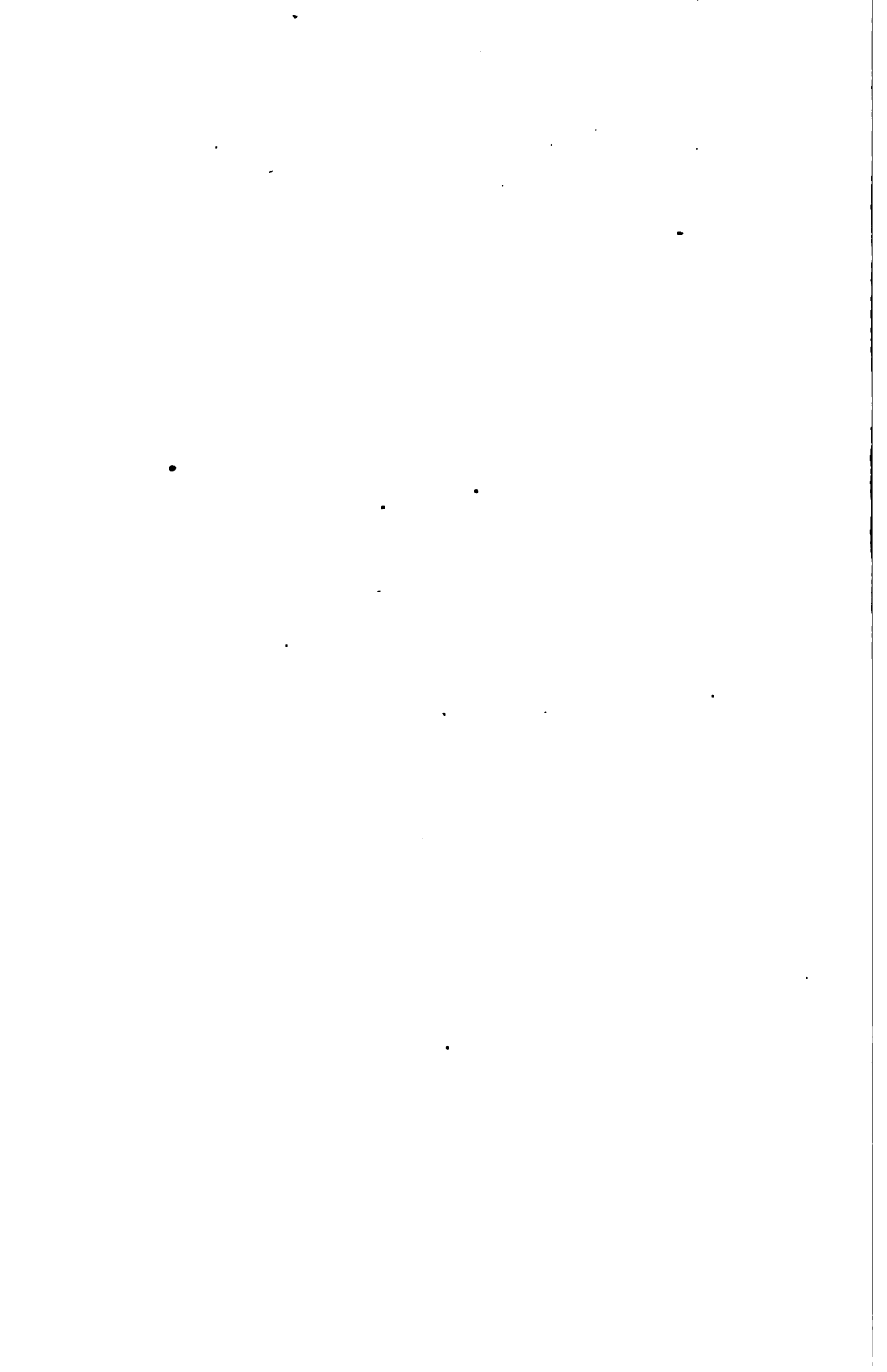
The School of  
Landscape Architecture













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**FORTY-THIRD ANNUAL REPORT**

**OF THE**

**STATE HORTICULTURAL SOCIETY**

**OF MISSOURI—**

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**ORGANIZED 1859**  
**INCORPORATED 1893**

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**MEETINGS AT**

**Chillicothe, June 5, 6, 7 and Farmington, Dec. 4, 5, 6, 1900**

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**L. A. GOODMAN, SECRETARY**  
**KANSAS CITY (WESTPORT), MISSOURI**



**JEFFERSON CITY, MISSOURI**  
**TRIBUNE PRINTING COMPANY, STATE PRINTERS AND BINDERS**  
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9 Jan. 1911  
DEPARTMENT OF ARCHITECTURE,  
HARVARD UNIVERSITY.

Gift of  
State Board of Horticulture  
404

MISSOURI STATE HORTICULTURAL SOCIETY.

*To His Excellency, LON V. STEPHENS, Governor:*

This report of our Society work, of the meetings held, of the moneys expended and of the local societies and counties reporting for the year 1900, is respectfully submitted.

L. A. GOODMAN, Secretary,  
Kansas City (Westport), Mo.

City of Jefferson, November 12, 1900.

*To the Commissioners of Public Printing:*

I require for the use of my office Four Thousand copies of Missouri State Horticultural Society Report for 1900—Two Thousand to be bound in cloth and Two Thousand to be bound in paper—which I desire as per accompanying sample. Respectfully,

L. A. GOODMAN, Secretary,  
Kansas City (Westport), Mo.

Approved:

A. A. LESUEUR, Secretary of State.

J. M. SEIBERT, State Auditor.

F. L. PITTS, State Treasurer.

## OFFICERS FOR THE YEAR 1900 AND 1901.

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Governor LON V. STEPHENS.....	Ex-Officio Member of Executive Committee
N. F. MURRAY, President.....	Oregon
D. A. ROBNETT, Vice-President.....	Columbia
SAMUEL MILLER, Second Vice-President.....	Bluffton
L. A. GOODMAN, Secretary.....	Kansas City (Westport)
A. NELSON, Treasurer.....	Lebanon

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## LIST OF HONORARY LIFE MEMBERS.

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R. H. JESSE, President State University.....	Columbia
HON. A. A. LESUEUR, Secretary of State.....	Jefferson City
J. C. EVANS.....	Harlem
MISS M. E. MURTFELDT.....	Kirkwood
GEORGE HUSSEMAN.....	Napa, Cal.
C. W. MURTFELDT.....	Kirkwood
HON. N. J. COLMAN.....	St. Louis
SAMUEL MILLER.....	Bluffton
PROF. M. G. KEHN.....	St. Louis
PROF. B. T. BUSH.....	Independence
PROF. B. T. GALLOWAY.....	Washington, D. C.
CONRAD HARTZELL.....	St. Joseph
PROF. H. E. VAN DEMAN.....	Parksley, Va.
PROF. J. T. STINSON.....	Mountain Grove
FRANK HOLSINGER.....	Rosedale, Kansas
WM. H. BARNES.....	Topeka, Kansas

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## LIST OF LIFE MEMBERS.

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WM. MUIR, old member.....	Fox Creek
H. CLAGGETT, old member.....	Kansas City
J. C. EVANS.....	Harlem
L. A. GOODMAN.....	Kansas City (Westport)
D. M. DUNLAP.....	Fulton
D. A. ROBNETT.....	Columbia
CHAS. HUBER.....	Seneca
C. H. EVANS.....	St. Louis
W. B. WILKINSON.....	Altenburg
H. M. WHITNER.....	Fredericktown
RIGHT REVEREND J. J. HOGAN.....	Kansas City
H. C. IRISH.....	St. Louis



## STANDING COMMITTEES.

### *Orchards.*

D. A. ROBNETT, Columbia. W. T. FLOURNOY, Marlonville. J. E. MAY, Wilson.

### *Vineyards.*

M. OLIVER COLE, Springfield. J. F. WILCOX, St. Joseph. RALPH BUSH, Bushberg.

### *Small Fruits.*

G. W. HOPKINS, Springfield. G. A. STONE, Richmond. HENRY SCHNELL, Glasgow.

### *Stone Fruits.*

W. A. GARDNER, Olden. J. H. KARNES, St. Joseph. ARTHUR PATTERSON, Kirksville.

### *Vegetables.*

B. A. BARNES, Trenton. J. P. SINNOCK, Moberly. J. K. SAUNDERS, Pierce City.

### *Flowers.*

MRS. G. E. DUGAN, Sedalla. C. I. ROBARDS, Butler. N. O. BOOTH, Columbia.

### *Ornamentals.*

PROF. H. C. IRISH, St. Louis. R. E. BAILEY, Fulton. H. S. WAYMAN, Alvord.

### *Entomology.*

MISS M. E. MURTFELDT, Kirkwood.

PROF. J. M. STEDMAN, Columbia.

### *Botany.*

B. F. BUSH, Independence. GEO. R. RAUPP, Monett. T. B. CHANDLER, Farmington.

### *Nomenclature.*

J. C. EVANS, Harlem.

W. G. GANO, Parkville.

A. NELSON, Lebanon.

### *New Fruits.*

SAMUEL MILLER, Bluffton.

R. J. BAGBY, New Haven.

K. B. WILKERSON, Mexico.

### *Ornithology.*

O. WIDMAN, Old Orchard.

A. H. GILKESON, Warrensburg.

C. W. MURTFELDT, Kirkwood.

### *Injurious Fungi.*

PROF. J. C. WHITTEN, Columbia.

DR. HERMAN VON SCHRENK, St. Louis.

### *Packing and Marketing Fruits.*

F. H. SPEAKMAN, Neosho.

T. R. PEYTON, Mexico.

HENRY ADKINS, Sarcoxie.

### *Transportation.*

G. T. TIPPIN, Nichols.

C. C. BELL, Boonville.

M. BUTTERFIELD, Lee's Summit.

### *Horticultural Education.*

Chairman, G. B. LAMM, Sedalla.

L. A. GOODMAN, Westport.

PROF. J. C. WHITTEN, Columbia.

MRS. G. E. DUGAN, Sedalla.

MISS M. E. MURTFELDT, Kirkwood.

PROF. WM. TRELEASE, St. Louis.

PROF. J. R. KIRK, Kirksville.

# MISSOURI STATE HORTICULTURAL SOCIETY.

*Organized January 5, 1859, at Jefferson City.*

*Incorporated 1893 at Jefferson City.*

## INCORPORATION AND REORGANIZATION OF THE HORTICULTURAL SOCIETY BY AN ACT OF THE GENERAL ASSEMBLY IN 1893.

The following law was passed by the Legislature incorporating the State Horticultural Society. The Executive Committee met soon after the passage of this act and accepted its provisions, and at the semi-annual meeting of the Society at Columbia, June 6, 7, 8, 1893, the act was adopted as part of the constitution of the Society.

### MEMBERSHIP.

Under the new constitution the law requires the payment of \$1 per year for membership fee. Life membership, \$10.

L. A. GOODMAN, Secretary.

### ACT OF THE GENERAL ASSEMBLY.

The Missouri Horticultural Society is hereby instituted and created a body corporate, to be named and styled as above, and shall have perpetual succession, power to sue and be sued, complain and defend in all courts, and to make and use a common seal and alter the same at pleasure.

The Missouri Horticultural Society shall be composed of such persons as take an interest in the advancement of Horticulture in this State, who shall apply for membership and pay into the Society treasury the sum of one dollar per year, or ten dollars for a life membership, the basis for organization to be the Missouri Horticultural Society, as now known and existing, and whose expenses have been borne and annual reports paid for by appropriations from the State treasury. The business of the Society, so far as it relates to transactions with the State, shall be conducted by an Executive Board, to be composed of the President, Vice-President, Second Vice-President, Secretary and Treasurer, who shall be elected by ballot at an annual meeting of the Society. The Governor of the State shall be ex-officio a member of the Board--all other business of the Society to be conducted as its by-laws may direct. All appropriations made by the State for the aid of the Society shall be expended by means of requisitions to be made by order of the Board on the State Auditor, signed by the President and Secretary and attested with the seal; and the treasurer shall annually publish a detailed statement of the expenditures of the Board, covering all moneys received by it. The Public Printer shall annually, under the direction of the Board, print such number of the reports of the proceedings of the Board, Society, and auxiliary societies as may, in the judgment of the State Printing Commission, be justified by the appropriation made for that purpose by the General Assembly, such annual report not to contain more than 400 pages. The Secretary of the Society shall receive a salary of eight hundred dollars per annum as full compensation for his services; all other officers shall serve without compensation, except that they may receive their actual expenses in attending meetings of the Board.

## CONSTITUTION.

ARTICLE I. This association shall be known as the Missouri State Horticultural Society: Its object shall be the promotion of horticulture in all its branches.

ART. II. Any person may become a member of this society upon the payment of one dollar and membership shall continue upon the payment of one dollar annually. Provided, however, that no person shall be allowed to vote on a question of a change of the constitution or the election of officers of this Society until after he has been a member for a period of one year preceding the time of election, except in case of a life member.

The payment of ten dollars at any one time shall constitute a person a life member and honorary members may be elected at any regular meeting of the Society: and any lady may become a member by giving her name to the Secretary.

ART. III. The officers of this Society shall consist of President, Vice-President, Second Vice-President, Secretary and Treasurer, who shall be elected by ballot at each regular annual meeting, and whose term of office shall be for one year, beginning on the first day of June, following their election. The President, Vice-President and Treasurer shall be eligible to but one successive re-election.

ART. IV. The elective officers of this Society shall constitute an Executive Committee, at any meeting of which a majority of the members shall have power to transact business. The other duties of the officers shall be such as usually pertain to the same officers in similar organizations.

ART. V. The regular meetings of this society shall be held annually on the first Tuesdays in December and June, except when otherwise ordered by the Executive Committee. Special meetings of the Society may be called by the Executive Committee, and meetings of the committee by the President and Secretary.

ART. VI. As soon after each regular annual meeting as possible, the President shall appoint the following standing committees, and they shall be required to give a report in writing, under their respective heads, at the annual and semi-annual meetings of the Society, of what transpires during the year of interest to the Society: Orchards, Vineyards, Stone Fruits, Small Fruits, Vegetables, Flowers, Ornamentals, Entomology, Ornithology, Rotany, Nomenclature, New Fruits, Injurious Fungi, Packing and Marketing Fruit and Transportation.

ART. VII. The Treasurer shall give a bond in twice the sum he is expected to handle, executed in trust to the President of this Society (forfeiture to be made to the Society). with two or more sureties, qualifying before a notary public, of their qualifications as bondsmen, as is provided by the statute concerning securities.

ART. VIII. This constitution may be amended by a two-thirds vote of the members present at any regular meeting.

## HOW TO ORGANIZE A HORTICULTURAL SOCIETY; ALSO THE CONSTITUTION FOR A LOCAL ORGANIZATION.

Anyone much interested on this subject of Horticulture can organize a society if he will speak to five or six different persons who are known to be prominent in this matter. Tell them that there ought to be a society in your county, and as it is such a good fruit country, ask them if they do not want to help organize one. You will hardly meet a refusal, but will be met with the remark "that they do not believe there is interest enough in your county to keep one up." Never mind this, but make an appointment to meet in some office in town on some Saturday. If you can get five to come together, organize and elect officers. Make the meetings regular each month and on the same Saturday. Some lawyer will let you have the use of his room to hold the meetings. Have the meeting in the best town in the county even if you have to go some distance to meet there. Talk this up until the next meeting, and let each one promise to bring another. Do not expect to have everyone belong, for they will not. Hold six winter meetings (November to April) in the city or village, and at the March or April meeting, select the places to hold the six summer meetings (May to October) at the homes of the members. Make this a picnic dinner, meeting about 10 o'clock, and after the dinner, hold the meeting and discussion; offer a few premiums for fruits and flowers, and have a general good time. Do not be afraid of a dollar or two, but use as much judgment in this matter as you would in any business of your own, and you will succeed. Talk to your neighbors about it if they are interested in fruit growing, if not, choose those who are so interested. They will not be much help to you if they are not fruit growers. Make out a program for the year, choosing one or two for an essay at each meeting. When the reports of the standing committees are made, have it done in writing, and have a report at every meeting. You can not expect to have everything work in complete order at first, and do not get discouraged if you find trouble at the start. Take your wives with you and have a good social

time also. If I can be of use to you at any time, I will come and visit you if it is possible for me to get away. I will try and bring someone with me also to help along the good work.

L. A. GOODMAN,  
State Secretary.

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## CONSTITUTION

Article I. This association shall be known as ——Horticultural Society.

Art. II. All persons interested in the subject of Horticulture may become members of this Society by signing the Constitution and paying annually to the treasurer the sum of one dollar: And provided further that any person paying at one time the sum of ten dollars to the treasurer, may become a life member, and thereafter exempt from annual dues: Provided, further, that all ladies may become members by signing the Constitution without the payment of one dollar.

Art. III.—Section 1. The officers of this Society shall consist of a president, vice-president, secretary, treasurer and executive committee, consisting of five, of which the president and vice-president shall be ex-officio members.

Sec. 2. The president shall exercise a general superintendence of the affairs of the Society; preside at all meetings of the Society; appoint all committees unless otherwise provided; draw all orders on the treasurer as directed by the Society; call special meetings of the Society or executive committee when deemed necessary; he shall be ex-officio president of the executive committee.

Sec. 3. The vice-president shall assist the president, and in his absence perform his duties, and be ex-officio a member of the executive committee.

Sec. 4. The treasurer shall receive all moneys belonging to the Society; shall keep a just and true account of the same, from what source received, and pay out the same upon the order of the president, counter-

signed by the secretary. At the meeting of the Society on the —— Saturday in December in each year (or oftener, if required by the executive committee), he shall make a full and complete report of all receipts and disbursements, and at the expiration of his term of office, turn over all books, papers, and all money or other property belonging to the Society, to successor in office. The treasurer, before entering on the discharge of the duties of his office, shall enter into a bond with sufficient security, to be approved by the president of the Society for its use, in the sum of ——, conditioned for the faithful performance of the duties required of him in this section.

Sec. 5. The secretary shall keep a full and complete minute of each meeting of the Society, and the proceedings of the executive committee. He shall receive and safely keep all books, periodicals, stationery, seeds, fruits and other like property of the Society subject to its order; shall correspond as may be necessary with all persons or societies as the welfare of the Society may demand. He shall report all the proceedings of the executive committee to the Society at its first meeting thereafter. He shall countersign all orders drawn upon the treasurer by the president under the direction of the Society, and have the care and custody of the seal of the Society.

Sec. 6. The executive committee shall assist and advise the officers in the discharge of their duties; prepare all premium lists; make all necessary arrangements for holding and conducting any and all such fairs as the Society may determine to hold, and such exhibitions of fruit as the Society may determine to make, and exercise a general supervision over the same, and generally to provide for the arrangements and business of the Society.

Art. IV. The officers of this Society shall be elected by ballot from among its members for the term of one year. The annual election shall be held at the regular meeting of the Society on the —— Saturday in December, where the general business of the Society shall be transacted. Vacancies may be filled at any regular meeting of the Society.

Art. V. The regular meeting of this Society shall be held on the —— Saturday of each month, at 1 o'clock p. m., at such places as the

Society may select, at ———: Provided, that the meetings in the months of May, June, July, August, September and October of each year may, by a vote of the Society, be held at the residence of any of the members outside of the city.

Art. VI. Executive committee may provide: First, for the payment of premiums to members of the Society for the best display of fruit, flowers or vegetables made at any regular meeting of the Society; second, for essays on any subject of interest to the Society, and arrangement of programme for the year; and third, for determining the places for each meeting of the Society for the months of May to October, inclusive.

Art. VII. Five members of the Society shall constitute a quorum at any meeting, and three members of the executive committee shall be authorized to transact business at any meeting of the committee duly called. Special meetings of the Society or executive committee may be held by order of the president or any three of the committee on one week's notice to all members of the Society or board (as the case may be), given personally, or through the postoffice. Adjourned meetings may be held from time to time, as the Society may determine.

Art. VIII. The funds of this Society shall not be apportioned to any purpose without a vote of a majority of the members present at any regular meeting of the Society.

Art. IX. This Society shall have the following standing committees, which shall be appointed by the president at the January meeting in each year: Small fruits, stone fruits, orchards, vineyards, vegetables, flowers, ornamentals, entomology, botany, to each of which shall be referred all matters relating to those particular subjects. Each of said committees shall consist of one to three members.

Art. X. This Constitution may be amended by a two-thirds vote of all the members of the Society at any regular meeting: Provided, that notice of the intended amendment shall have been given at least one month prior to any action taken thereon.

Art. XI. The meetings of this Society shall be governed by the parliamentary rules usual for deliberative bodies.

LIST OF COUNTY SOCIETIES.

- Adair County Horticultural Society—**  
R. M. Brasher, president, Kirksville.  
A. Patterson, secretary, Kirksville.
- Atchison County Horticultural Society—**  
C. N. Coe, president, Tarkio.  
R. Lynn, secretary, Tarkio.
- Andrain County Horticultural Society—**  
M. B. Guthrie, president, Mexico.  
K. B. Wilkerson, vice-president, Mexico.  
R. A. Ramsey, secretary, Mexico.  
W. G. Hutton, ass't. secretary, Mexico.  
Wm. Eagan, ass't. secretary, Mexico.  
W. M. Pearson, treasurer, Mexico.
- Barry County Horticultural Society—**  
W. W. Witt, president, Exeter.  
E. B. Utter, vice-president, Butterfield.  
G. G. James, secretary, Halley.  
J. C. Crane, treasurer, Exeter.
- Barton County Horticultural Society—**  
B. D. Hayes, secretary, Lamar.
- Bates County Horticultural Society—**  
C. I. Robards, president, Butler.  
J. B. Speer, secretary, Butler.
- Billings Horticultural Association—**  
John Ansler, president, Billings.  
Freeman Conrad, vice-president, Billings.  
Fred Debrunner, secretary, Billings.  
R. A. Hall, treasurer, Billings.
- Birch Tree Fruit Growers' Association,  
Shannon County—**  
Jas. Kirkendal, president, Birch Tree.  
F. Anderson, secretary, Birch Tree.
- Bismarck Fruit Growers' Association, St.  
Francois County—**  
C. J. Tullock, president, Bismarck.  
M. H. Dowling, secretary, Bismarck.
- Boone County Horticultural Society—**  
D. A. Robnett, president, Columbia.  
Jos. Baumgartner, secretary, Columbia.  
G. W. Burrough, treasurer, Columbia.
- Buchanan County Horticultural Society—**  
W. Fleeman, president, St. Joseph.  
J. H. Karnes, vice-president, St. Joseph.  
F. McCoun, secretary, St. Joseph.  
R. Onstot, treasurer, St. Joseph.
- Butler County Horticultural Society—**  
D. C. Kitteridge, president, Poplar Bluff.  
E. R. Lentz, secretary, Poplar Bluff.
- Butterfield Local, Barry County—**  
I. R. Crane, secretary, Butterfield.
- Benton County (Ark.) Horticultural So-  
ciety—**  
C. J. Eld, president, Bentonville.  
I. Henthorn, vice-president, Bentonville.  
I. B. Lawton, secretary, Bentonville.  
Geo. Bill, treasurer, Bentonville.
- Calloway County Horticultural Society—**  
D. M. Dunlap, president, Fulton.  
R. E. Bailey, secretary, Fulton.
- Camden County Horticultural Society—**  
J. W. Burhans, president, Stoutland.  
J. C. Evans, secretary, Stoutland.
- Central Missouri Horticultural Associa-  
tion—**  
D. Nixon, president, Harriston.  
D. Edwards, first vice-president, Boon-  
ville.  
Mrs. John Durr, second vice-president,  
Boonville.  
C. C. Bell, secretary, Boonville.  
W. A. Smiley, treasurer, Boonville.
- Clay County Horticultural Society—**  
F. M. Williams, president, Barry.  
Oliver Chedlater, secretary, Linden.
- Cole County Horticultural Society—**  
J. B. Brooks, president, Jefferson City.  
T. M. Barker, vice-president, Centertown.  
A. J. Davis, secretary, Jefferson City.  
F. M. Brown, treasurer, Jefferson City.
- Conway Horticultural Society, Laclede  
County—**  
W. H. Getty, president, Conway.  
R. O. Hardy, secretary, Conway.
- Exeter Horticultural Association, Bagby  
County—**  
W. W. Witt, president, Exeter.  
Jesse Talbert, vice-president, Exeter.  
John Erwin, secretary, Exeter.  
K. Armstrong, treasurer, Exeter.
- Gentry County Horticultural Society—**  
W. A. Garrett, president, Albany.  
G. E. Adams, secretary, Darlington.  
Wm. David, treasurer, Albany.
- Greene County Horticultural Society—**  
J. A. Stanton, president, Springfield.  
Rev. F. Hurd, vice-president, Springfield.  
Miss E. J. Park, secretary, Springfield.  
H. H. Park, treasurer, Springfield.



**Henry County Horticultural Society—**

M. L. Bonham, president, Clinton.  
H. C. Green, vice-president, Clinton.  
J. M. Prezinger, secretary, Clinton.  
H. F. Burris, treasurer, Clinton.

**Holt County Horticultural Society —**

N. F. Murray, president, Oregon.  
J. N. Menifee, vice-president, Oregon.  
H. P. Blanchard, secretary and treasurer, Oregon.

Wm. Kaucher, librarian, Oregon.

**Jasper County Horticultural Society—**

F. A. Hubbard, president, Carthage.  
Th. Betebanner, vice-president, Carthage.  
Z. T. Russell, secretary, Carthage.

**Koshkonong Horticultural Society—  
County—**

T. M. Culver, president, Koshkonong.  
C. M. Alderson, secretary, Koshkonong.  
H. C. Huxley, treasurer, Thayer.

**Laclede County Horticultural Society—**

A. Nelson, president, Lebanon.  
E. B. Kellerman, secretary, Lebanon.  
Dr. R. Duffman, treasurer, Lebanon.

**Lafayette County Horticultural Society—**

H. Turlenkle, president, Alma.  
W. P. Keith, vice-president, Mayview.  
G. H. Roblus, secretary, Mayview.

**Lawrence County Horticultural Society—**

W. T. Seward, president, Marionville.  
B. Logan, secretary, Marionville.  
N. Beckner, treasurer, Logan.

**Lincoln County Horticultural Society—**

A. H. Kercheval, president, Elsberry.  
R. C. Benedict, secretary, Moscow Mills.

**Linn County Horticultural Society—**

A. P. Swan, president, Merceline.  
I. D. Porter, vice-president, Merceline.  
S. H. Linton, secretary, Merceline.  
J. W. Porter, treasurer, Merceline.

**Livingston County Horticultural Society—**

G. A. Smith, president, Chillicothe.  
D. A. French, vice-president, Chillicothe.  
J. T. Jackson, secretary, Chillicothe.  
R. M. Meager, treasurer, Chillicothe.

**Madison County Horticultural Society—**

A. A. Blumer, president, Fredericktown.  
H. M. Whitner, secretary, Fredericktown.

**Meramec Horticultural Association, Craw-  
ford County—**

E. R. Bowen, president, Steelville.  
Peter Lovengood, vice-president, Steelville.  
Jos. F. Marsh, secretary, Steelville.  
K. D. Norval, ass't secretary, Steelville.  
Chas. Lay, treasurer, Steelville.

**Mercer County Horticultural Society—**

J. F. Stanley, president, Cainesville.  
A. R. Mann, vice-president, Spickards.  
H. S. Wayman, secretary, Alvord.  
J. M. Perry, treasurer, Princeton.

**Miller County Horticultural Society—**

John Vetter, president, Eldon.  
E. M. Lumpkin, vice-president, Spring Garden.  
N. J. Shepherd, secretary, Eldon.  
J. R. Helfrich, treasurer, Eldon.

**Missouri-Arkansas Horticultural Society—**

D. S. Helvern, president, Mammoth Springs, Ark.  
P. B. P. Hynson, secretary, Mammoth Springs, Ark.

**Missouri Valley Horticultural Society—**

Homer Reed, president, Kansas City.  
Edwin Taylor, vice-president, Edwardsville, Kan.  
A. Chandler, secretary, Argentine, Kan.  
G. F. Espenlaub, treasurer, Rosedale, Kan.

**Monett Local—Barry County—**

R. D. Creed, president, Monett.  
E. O. Snyder, vice-president, Monett.  
Geo. Raupp, secretary, Monett.  
L. C. Ferguson, treasurer, Monett.

**Montgomery County Horticultural Society—**

F. K. Gutman, president, Hugo.  
C. Hausser, secretary, Hugo.

**Mound City Horticultural Society—**

D. B. Browning, president, Mound City.  
J. M. Hasness, secretary, Mound City.

**Neosho Fruit Growers and Shippers Asso-  
ciation (Newton County)—**

R. P. Liles, president, Neosho.  
J. H. Richardson, vice-president, Neosho.  
F. H. Speakman, secretary, Neosho.  
Scott Ferris, treasurer, Neosho.

**Norwood Horticultural Society—**

J. W. Hollenbeck, president, Norwood.  
W. S. Calhoun, secretary, Norwood.

**Pettis County Fruit and Dairy Club—**

Ed. Brown, president, Sedalia.  
G. B. Lamm, secretary, Sedalia.  
J. H. Monsees, treasurer, Beaman.

**Phelps County Horticultural Society—**

Robert Merriwether, president, Rolla.  
Albert Newman, secretary, Rolla.

Polk County Horticultural and Agricultural Association—

G. W. Williams, president, Humansville.  
G. M. Briggs, secretary, Humansville.  
A. H. Schofield, treasurer, Humansville.

Polk County (Ark.) Horticultural Society—

A. W. St. John, president, Mena, Ark.  
Frank Talbert, vice-president, Dallas, Ark.  
F. S. Foster, secretary, Mena, Ark.  
G. S. Graham, treasurer, Dallas, Ark.

Pulaski County Horticultural Society—

G. W. Faust, president, Richland.  
H. T. Hunter, vice-president, Richland.  
A. W. Rausch, secretary, Richland.  
H. M. Smith, treasurer, Richland.

Randolph County Horticultural Society—

B. B. Boucher, president, Cairo.  
G. N. Ratliff, vice-president, Moberly.  
J. W. Dorsey, treasurer, Moberly.  
C. W. Halliburton, secretary, Moberly.

Ray County Horticultural Society—

A. Maitland, president, Richmond.  
G. A. Stone, vice-president, Richmond.  
R. Williams, secretary, Richmond.

Republic Horticultural Society, Greene County—

W. O. Wade, president, Republic.  
W. E. Goodwin, vice-president, Republic.  
T. B. Wallace, secretary and treasurer, Republic.

Ripley County Horticultural Society—

J. G. Hancock, president, Doniphan.  
S. S. Hancock, secretary, Doniphan.

St. Francois Horticultural Society—

J. B. Highley, president, Farmington.  
N. J. Counts, vice-president, Farmington.  
T. B. Chandler, secretary, Farmington.  
J. R. Pratt, treasurer, Farmington.

St. Louis County Horticultural Society—

Henry Wallis, president, Wellston.  
H. Meyer, vice-president, Bridgeton.  
H. C. Irish, secretary, St. Louis.  
Chas. Kern, treasurer, Ascalon.

Saline County Horticultural Society—

J. T. Stewart, president, Blackburn.  
Thos. Adams, secretary, Marshall.

Sarcoile Gandy Fruit Growers' Association—

J. M. Davidson, president, Sarcoile.  
John Carnahan, secretary, Sarcoile.  
W. T. Burkholder, cor. secretary, Sarcoile.

Sarcoile Horticultural Association—

J. C. Reynolds, president, Sarcoile.  
John Johnson, vice-president, Sarcoile.  
J. B. Wild, secretary, Sarcoile.  
H. B. Boyd, treasurer, Sarcoile.  
J. W. Haggard, manager, Sarcoile.

Seligman Local—Barry County—

G. W. Roler, president, Seligman.  
H. M. Foster, secretary, Seligman.

Seymour Horticultural Society, Webster County—

T. C. Love, president, Seymour.  
A. Dolby, vice-president, Seymour.  
L. S. Witmer, rec. secretary, Seymour.  
F. A. Williams, cor. secretary, Seymour.  
Thos. J. Smith, treasurer, Seymour.

Shannon County Horticultural Society—

Jos. Holt, secretary, Monteer.

South Missouri Fruit Growers' Association, Howell County—

Geo. Comley, president, Willow Springs.  
J. Lovewell, secretary, Willow Springs.

South Missouri Horticultural Association, Howell County—

D. J. Nichols, president, West Plains.  
J. W. Hitt, vice-president, West Plains.

Southwest Fruit Growers' Co-operative Union—

M. P. Glassford, president, Pierce City.  
E. L. Parker, vice-president, Pierce City.  
R. F. George, secretary, Pierce City.  
J. B. Jones, treasurer, Pierce City.

Union Horticultural Society—

E. S. Link, president, Jefferson City.  
D. A. Robnett, vice-president, Columbia.  
A. J. Davis, secretary, Jefferson City.

Vernon County Fruit Growers' Association—

Lewis Miller, president, Nevada.  
J. Kennedy, vice-president, Nevada.  
W. H. Litson, Jr., secretary, Nevada.  
J. N. Shipley, treasurer, Nevada.

Washburn Local—Barry County—

H. J. Wood, president, Washburn.  
J. D. Berryhill, vice-president, Washburn.  
J. G. Marcum, secretary, Washburn.  
J. J. Hickman, treasurer, Washburn.

Wayne County Horticultural Society—

J. A. Bailey, president, Wappapello.  
Chris. Richman, vice-president, Lowndes.  
John Ware, secretary, Wappapello.  
Jacob Fry, treasurer, Wappapello.

Wright County Horticultural Society—

H. H. Keely, president, Mt. Grove.  
M. Porter, vice-president, Mt. Grove.  
Mrs. C. C. Key, secretary, Mt. Grove.  
Mrs. C. B. Brooker, treasurer, Mt. Grove.



# **SUMMER MEETING**

**AT CHILLICOTHE, JUNE 5, 6, 7, 1900.**



## SUMMER MEETING.

The Society held its semi-annual meeting June 5 to 8, at Chillicothe, Livingston county. The seven sessions took place in the Masonic Temple.

Music opened the program, and young ladies at the piano and violins enlivened the evening sessions.

The invocation was delivered by Prof. G. A. Smith.

President Allen Moore of the Chillicothe Normal School, presented the welcoming words, in substance as follows: "A Welcome consists in the courtesy and handshake and not in words of address. This convention carries much weight and good where it meets, because of what the people bring, namely, intelligence and experience for the benefit of all and also of what they gain to take away. The wealth of a nation is the measure and result of its intelligence. Horticulturists are producers, investigators and thinkers. We are glad to have you with us because you are producers adding to the honor of the country and state. Wealth comes from the earth and not from selling, therefore, it is due to farmers and horticulturists. There are some men who do not eat meat, but I never heard of a man who did not eat fruit, hence you touch us all. It is an honor to be a benefactor making two blades of grass to grow in place of one—those who produce apples instead of crabs are philanthropists—an honored class. The apple is a product of man's and God's intelligence. You stand crowned as an honorable class.

"We are glad to have you with us because we have some things of which we are proud. We welcome you to a city having educational institutions, people of culture, enterprise and energy. We are happy and proud that you have come among us."

President Murray in responding accepted the welcome and thanked all who had helped in providing homes, entertainment for visitors,

decorating the hall and arranging the program. "Nine years ago we met here and are still pursuing the spirit of missions which we adopted from the first. The fruit centers developed at the points where we have met are evidence of our success in home missions. The seeds have brought forth abundantly whether sown in the rich land of north Missouri or on the rocky soil of the south. Our great state is most favorably situated in the fruit belt of the continent. Another evidence is in our prize-winning exhibits in this country and in France. We have schools and courses of horticulture for training the inexperienced. Intelligence becomes capital in horticultural lines. The fruit grower does not become rich in a year, but then it is not best to achieve success without effort; nevertheless there are fewer failures in the business of horticulture than any other. Training and development are needed therefore we have institutes, schools and courses of horticulture. Do not despair of difficulties. Perseverance, judgment and courage are needed to make a success of this business. The canker worm was at work 800 years before the Christian era. People can be encouraged to develop the land throughout the state, when they know that an acre of well cared for orchard will net \$200 a year (from that to \$1,000), berries from \$500 to \$800 an acre, and one man had \$19,000 from his peaches in five years. Fear of overproduction need not frighten you, for have we not a limited fruit belt, with an increasing population and an increasing desire for fruit? Fruits and flowers are conducive to health and contribute to one of the sweetest and best pleasures of life—the contentment and uplift arising from the association with the beautiful. College grounds, parks and highways ought to be planted and every home surrounded with useful and ornamental trees. The forest and orchards, streams and birds are given to make us happy and prosperous. We invite all to attend—bring your friends and we believe we can give you something and take home more than we bring."

## FRUIT GROWING.

By G. A. Smith, LL. D., of the Chillicothe Normal, Chillicothe, Mo.

**Location and Soil.**—It is not my purpose in this paper to indulge in figures of rhetoric, nor to exercise the imagination. I shall endeavor to state hard, cold facts as I have gleaned them in an experience of seven years. I first bought two small tracts of land, one in a good farming section and the other on the white oak ridges of Grand river. Perhaps no two small tracts contain a greater variety of soil. The principal tract is underlaid with a porous clay subsoil, some parts having the soil all washed off, while other parts are still rich. Some of the land has been in cultivation thirty years, and some is virgin soil. The soil on Grand river varies from the rich black soil of the river bottom to the rough white oak points almost pure sand and gravel. Some is flat and some is so steep that it can not be plowed. My best trees are found scattered over almost all kinds of soil, except the thin, worn out clay soil. On an average the best trees are on sandy hills and the sandy bottom of Grand river; and by far the greatest amount of fruit has been secured from these locations. I have also found that ground which has been in cultivation fifteen or twenty years produces better trees than virgin soil. This is especially true on the richest places:

**Trees.**—I have planted trees one year old, two years old, three years old, and four years old. The two year old trees have proved most satisfactory, while the three year old trees came next in the list. The other two kinds have been highly unsatisfactory with me. Of the eight thousand planted, about six thousand are Ben Davis, nearly one thousand are Willow Twig, and about the same number are Jonathan. Besides these I have a variety orchard of about one hundred trees. The profits thus far are pretty evenly divided between the Willow Twig and the Ben Davis, with the odds in favor of the Willow Twig. At this writing the Willow Twig has much the better prospect for a crop. The growth has been quite uniform in the Ben Davis, the Jonathan and the Willow Twig. I have lost one Willow Twig from blight, but in general the trees are in excellent condition. The severe winter of



1898-99 injured quite a number of the Jonathan, but killed none. This year they bloomed profusely, but set very little fruit. These trees are seven years old and younger.

**Planting.**—The ground was plowed and made ready for the planting of corn. Blocks were laid off by means of sight sticks, and pins were placed where the trees were to stand. Then a setting-board was prepared, by means of which the trees were set exactly where the pins had been placed. By this means I succeeded in making very straight rows. It cost a little extra labor to set them in this manner, but the results are very satisfactory to a man who has a mechanical eye. Holes were made sufficiently large to receive all the roots without bending them. Very little trimming was done, just enough to shape the tree. Great care was taken to leave no spaces about the roots where the air could enter. The dirt was packed firm and the tree set as nearly perpendicular as possible. The heaviest portion of the top was placed toward the southwest.

**Culture.**—Having planted the trees twenty-seven feet apart, there was just room for six rows of corn between the trees and one row in line with the trees. This put each tree in the exact position of a hill of corn, thus making the culture easy, and leaving the dead furrow in the center between two rows of corn. I have cultivated in corn almost exclusively and have hoed the trees very carefully for the first three or four years. I have done very little trimming, always taking care to shade the body on the southeast side. When the wind has leaned the trees I have had them promptly strightened. Care has been taken to avoid forks and crossing limbs; but further than this no trimming has been done. Several professional trimmers have paid me visits and have volunteered volumes of information and advice, but I have given them a respectful hearing and have remained of "the same opinion still."

**Enemies.**—Thus far the common round headed borer has been my worst enemy. True, I have had experience with the woolly aphis, the codling moth, the canker worm, the mouse and the rabbit. All kinds of remedies for the prevention and destruction of the borer have been suggested by those interested or not interested, but thus far I have

found nothing like two good eyes and a good sharp knife. I was once beguiled into buying several thousand veneer wrappers for the purpose of protecting the trees against borers and rabbits. They kept the rabbits off when I could keep the wraps on; but they furnished a good harbor for mice, and I lost more trees from the ravages of mice than from the ravages of rabbits, even when no wraps were on. But I have usually kept my trees well wrapped with corn stalks till five years old, unless there was plenty of corn in the field. I keep from two to four dogs, and rabbits have done very little damage. Nothing at all has been done for the woolly aphis, except to kill those in sight. Very soon they disappeared, although the orchard was badly infested for two years. The canker worm has done some damage and I have been experimenting with arsenic and London purple. These remedies seem to be about equally effective. Neither killed all the canker worms, but I can easily tell where I sprayed, even under adverse circumstances. I shall prepare to spray more extremely next year. By far the greatest pest in my orchard has been the borer. Quite frequently there can be found in one tree as many as twenty borers. Of course, these would soon kill the tree, if I permitted them to remain. I have seen washes of various kinds tried, but nothing so far has been effective. Wire screen may help somewhat, but borers will get behind the wire. Besides wire is in the way and is also expensive. Some say that borers will not work on bottom land. But I happen to have about twenty acres on Grand river bottom. The trees here are frequently badly infested. Sometimes the ridges are almost clear of borers, and again they are badly infested. So also with all locations. Some seasons the lowlands are almost clear and the ridges are infested, and perhaps the next year the reverse will be true. It takes vigilance to keep them out.

My plan thus far has been to remove the borers three times a year. In the spring about corn planting time, I have the dirt removed about six inches, and the trees are carefully examined and the borers removed. The dirt is then returned by means of a shovel or spade, and a neat hill about six inches high is placed around the tree. This hill is allowed to remain as long as it will. The beetle in depositing her

eggs must put them above this hill, and the gradual lowering of the hill by rain and other agencies will leave the young borers exposed to view, and above the surface of the ground. All the tools needed in August are a sharp pocket knife and a butcher knife for removing the dirt whenever necessary. But eighty per cent of the borers will be in plain sight several inches above the ground. Under these conditions a good brisk hand can remove the borers from eight hundred or a thousand trees a day, if the trees are not over six years old. It is common to catch from five hundred to a thousand borers in a day. This may seem large, but this is just what has been often done in my orchard at different times and by different men. About October the borers of later development or those that may have been missed in August are removed. In this way I have managed to keep my trees almost entirely free from injury, as the trees will now show. The total yearly cost of ten thousand trees averaging four years old need not exceed fifty or sixty dollars per annum. This beats wire, veneer, washes, or anything else I have ever tried. It is needless to add that I am satisfied with results.

Peaches.—We live rather too far north to raise peaches successfully. And yet, since I have lived at Chillicothe we have had peaches more than half the years. I found during the winter of 1898-99 that under the same conditions seedling peaches were more hardy than the budded varieties. Of the budded peaches the Champion seems to be the hardiest, and the Elberta the tenderest. Peaches have their enemies, the chief of which in this section are the cold winters and the borers. Leaf curl sometimes does some damage, but this damage is not extensive.

Pears.—Kieffer pears seem to do well here. They are almost free from blight, and bear quite regularly. Most other varieties are not satisfactory.

Cherries and Plums.—These fruits do well here, but the curculio sometimes almost entirely destroys the crop, especially plums. Yet I believe they can be raised with profit, especially the Wild Goose plum, and the Early Richmond and the English Morillo cherry.

Berries.—In addition to the growing of trees, I have raised some

strawberries, raspberries, and blackberries. These sometimes pay, and sometimes they do not. I place these berries between young trees in the orchard. Strawberries have thus far been most profitable and raspberries the least profitable. Anthracnose is the worst enemy of raspberries, and cold winters and dry summers are the worst enemies of blackberries.

In conclusion I desire to state that the path of the fruit grower is not crowned with flowers entirely free from thorns. But in general he is the most hopeful and unselfish of men. If his crops and his trees are destroyed he looks hopeful for better times. He lives in the future. He sees a better time beyond. He volunteers his advice to those in similar pursuits. He has no trade secrets. His strongest competitor can receive the benefit of his experience. He will advise others to enter the horticultural field, when he well knows a competition will thus be set up. But horticulture has its rewards. It is a noble calling. It suggests Paradise with its beautiful gardens. It suggests the New Jerusalem with its twelve manner of fruits. It inspires the true horticulturist to live better, to do better, to be better.

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## PLANT BREEDING.

By J. C. Whitten, Columbia, Mo.

The term plant breeding too frequently suggests to the mind of the grower merely the crossing of plants. If the improvement of plants is suggested, it is often construed to mean simply the crossing of some well known variety with another to secure a new sort. Without any special reason why, this proposed new variety is expected to be superior to either parent. It is ordinarily supposed to be a very simple matter, for example, to cross a strawberry that has rich color with one which possesses high flavor and secures a new variety which shall combine both these characteristics to a marked degree. I am not able to

say why this conception should be so general. It may be because of our increasing knowledge of the fact, first prominently brought to our attention by Darwin, that cross-fertilization among plants is generally beneficial. No doubt, too, there is something fascinating in the idea of the outright production of a new variety before our very eyes.

The introduction of new varieties is certainly of great importance to the horticulturist. And yet, to the average grower it is by no means the most important consideration in the improvement of plants. To the ordinary cultivator plant breeding should consist of the improvement of varieties ordinarily grown instead of the making of new sorts. It is only in the hands of a few that really good, new varieties are produced anyhow and these are usually men who make a business of creating or introducing new sorts. It is possible for almost any grower to improve his plants by selection and good care.

If one wishes to improve a variety it is well to get in mind a few fundamental principles. First, it should be remembered that there is universal variation among plants. The observation of this truth is the most important factor in the improvement of plants. No two plants even of the same variety are just alike. A packet of seeds of the Stone tomato were planted in the Station hot-bed, where soil and other conditions were as nearly uniform as it was possible to make them. Some of the plants came up before the others. Some of them were stout and stocky and others much less so. At the time of transplanting the largest was seven inches high and the smallest less than four inches high. What gardener would fail to take advantage of this opportunity to select the best? In *Daturas*, grown from seeds from a single capsule even a greater difference was noticed. Similar variations in size and vigor are usually noticeable in young plants, and usually taken advantage of by the gardener.

Not only do plants of the same variety, differ in size and vigor but also in earliness, productiveness and other qualities. Early or late corn may be quickly obtained by selecting seed from the earliest or the latest plants. The yield of a variety of corn has in many cases been greatly increased by selecting seed from the most productive plants. The same thing has been done in most of our cultivated plants. By

far the larger part of the new varieties of our garden vegetables (usually called "improved") are only strains of the old varieties, changed somewhat by selection and given a new name.

The seeds from a single capsule of the sweet English violet were planted in the Experiment Station grounds. Several plants were grown, and a record kept of the number of flowers produced by each. Next season cuttings were made from the plant that produced the most flowers and also from the one that produced the fewest. A record was kept of the flowers produced by each of these and cuttings were again taken from the best and the poorest producers. This was kept up for three generations. At the end of that time the plants had become so different in point of the number of flowers that for every three produced on the poorer plants there were seventeen on the better plants. This same idea is carried out by the leading florists who select their cuttings from those plants that produce the most flowers or those that produce the largest flowers.

In selecting either seeds or cuttings for the propagation of a plant it is essential to take into consideration the whole plant, and not merely some branch of it. First, the plant should be uniform in all its parts, not one that has a good branch here and a poor one there, or one that produces a good flower on one part and poor flowers elsewhere. Livingston, in his book on the Tomato, says that he wasted fifteen years trying to improve the tomato without getting any results. His mistake was that he selected the largest tomato in the field, regardless of the kind of plant it came from or the character of the other fruits on the same plant. It is reasonable to suppose that the plant that produces only one good tomato may make that a very good one, having little else to do. And yet the seeds of that tomato, coming from a plant that produced mainly poor tomatoes will likely give plants that will produce mainly poor tomatoes. The writer grew a potato that weighed four and one-half pounds. It was the only good one on the whole plant. There were a number of small, worthless ones. This large potato was planted and the crop grown from it was poor, not one of the potatoes being anywhere near so large as the mammoth specimen planted. This potato came from a plant which for the most part produced poor potatoes.

and nonuniformity and a poor crop was the natural result. It has come to be a recognized fact among growers that the very largest potatoes are inferior to the smooth, symmetrical ones for seed. This is perhaps due to the fact that the uniform, smooth ones come from those plants that produce medium sized, uniform tubers and consequently give uniform results. When a plant produces only one good potato in twenty it is to be expected that only one twentieth of the crop will be good.

Plants are modified in their characters by soil, climate and other phases of their environment. In selecting for a given purpose this should be borne in mind. In forcing radishes and beets in the hot-bed in winter one of the drawbacks is to get a strain that will endure these conditions of artificial heat and a very fertile soil without running to tops. That is, the tendency is to make luxuriant leaf growth and not to make large roots, crowded as they are in small space. At the Experiment Station we have found that if we set the young beets and radishes for a time in small pots, until their roots have become crowded, and then plant them where they are to make a crop, they will quickly form much larger and better roots than will those that grow where the seed is planted.

There is perhaps no other phase of this subject that is of more importance to the members of this society than selecting scions from the best trees. It is observable in almost any orchard that some trees produce uniformly better crops than do other trees of the same variety. The orchardist may improve his trees by propagating from those that are noticed to give the best crops year after year. In propagating peaches the buds should be selected from those bearing trees that produce the best and are the best trees generally. Our well known Gano apple is now regarded as a sport of Ben Davis. That is, scions were taken from a Ben Davis tree that produced uniformly redder and more symmetrical apples than usual and here the Gano had its origin. The best growers are now beginning this practice. It is nothing more than the florists have done for decades and should give the same results in the improvement of varieties of fruit.

SECOND SESSION.—Wednesday, 9 A. M.

The morning session opened with prayer.

The general subject of strawberries was introduced by a talk by Judge Samuel Miller.

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STRAWBERRIES—LAND, LOCATION, VARIETIES.

By Henry Schell, Glasgow, Mo.

Mr. President, Ladies and Gentlemen:—There has been so much said and written on this subject that we will have to “thresh over some of the old straw.” Any land that will produce good corn and potatoes will bring good strawberries. Level land is preferable, as slopes are washed so by heavy rains, though we have had better crops as a rule on clay hillsides than on the richer level soils. While the berries are not so large on the thinner hillsides, there is less tendency to excessive leaf or top growth and imperfect fertilization. Fresh sod or clover land can always be depended upon for a good crop, but land that has grown five to six crops of berries needs, in addition to stable manure some commercial fertilizer containing eight or ten per cent potash at least. Bone meal and wood ashes are excellent. As a rule on land where berries have been grown for a number of years, even with plenty of fertilizer and proper rotation, the crop does not seem to do as well as on fresh land that produces the first crop. However, this does not always hold good, for in 1897 we picked 250 bushels per acre and it was the fourth crop taken from that piece, being the second crop of the second planting with rotation two years between the two plantings.

As to location, a southern slope for the early varieties and a northern one for the late will lengthen the picking season eight or ten days. Regarding varieties we plant as about in the order named.



Haverland, Excelsior, Jessie, Windsor Chief, Barton's Eclipse, Bubach No. 5, Parker Earle, Tennessee Prolific, Beder Wood, Ruby, Gandy and some others.

The Bubach seems to be a general favorite judging from the sale of plants, but we do not grow it very extensively for fruit as it is so soft and soon loses its color after picking. Excelsior ripened its first May 14, this year—'tis the earliest one we have, medium, to small in size, but a good berry in every other respect. Gandy still holds first place for best late, with Windsor Chief second, and from the appearance of the Seaford planted this spring it will be a rival for the Gandy. Haverland has never failed to give us a crop and is a safe one to plant. Ruby regained its lost laurels this year—'tis fine. Clyde has come to stay and is good, only somewhat pale in color. Parker Earle, Tennessee Prolific, Barton's Eclipse and the rest named are all large, fine and productive. Among the newer ones Sample is immense. Nick Ohmer, Glenn Mary and others planted this spring all have ripened some fine fruit. While it is not advisable to have too many varieties it is also unwise to plant only a few, as some seasons some variety may be almost a failure and the next year vice versa. We keep trying the new ones, but the old standbys are hard to improve on. For plenty of berries plant Beder Wood and Crescent seedling, especially for home use; but for market unless grown in thinly matted rows they soon run too small.

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## STRAWBERRIES FOR FARMERS.

William L. Culver, Grayson, Mo.

The subject assigned to me of how to prepare and set strawberry plants will be treated only from the standpoint of a farmer raising strawberries for home use alone. I have no experience in propagating plants for setting and believe the average farmer should always pur-

chase his plants of a reputable grower. Such has been my practice. So I can give no advice as to the preparing of plants for setting from experience which I believe is the only true teacher.

As to setting of plants, early spring I consider the proper time. The ground should have been in preparation two or three years in advance of the setting, as to the fertilizing and the preventing of weeds going to seed. In Clinton county any No. 1 corn land will produce fine strawberries. The ground having been properly prepared, the rows should be marked off, with a marker, five feet apart. The plants should be set two feet apart in the rows as follows: Make a small mound in the mark every two feet, set your plant on the mound, spread out the roots in their natural position, draw in the fine dirt, and press firmly by hand. The plant should not be set any deeper in the ground than it grew originally, and no dirt should be on the crown. If, at the time of setting, the ground should be dry I think it best to use one pint of tepid water to each plant. Where water is used the surface dirt around plant should be left dry at time of setting. The question of cultivation, etc., are not embraced in my subject, but will say the reason most farmers have no strawberries is that after planting they fail to cultivate. In my opinion the farmer who does not have a bountiful supply of strawberries for his family has denied the faith and is worse than a heathen.

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#### Discussion.

D. A. Robnett, Boone county.—Advised using the spade in planting.

## REPORT ON VARIETIES.

J. E. May, Adair Co.

The report of my different varieties of strawberries for last year holds good this year, except Lovett's Early and Bismarck are doing some better this year than last.

Haverland.—A fine large berry of good quality; a great yielder.

Greenville.—A grand berry both in berry and plant, but a little soft to ship well.

Glenn Mary.—A perfect failure.

Sharpless.—Only a few berries and lots of buttons. Will discard it.

Warfield.—One of the old stand-bys.

Bubach, No. 5.—Grand in every way.

Clyde.—A fine berry but a little light in color.

Bismarck.—A fine berry in plant, but produced too many buttons and the fruit is too light in color.

Michel's Early.—Not good.

Jessie.—Only a fair crop.

Beder Wood.—Only a fair producer of medium sized berries.

Parker Earle.—Has never paid me anything, but am trying it on very rich ground this year and hope for good results.

I have a berry that I got under the name of Tippecanoe that is a great cropper of fine large berries, but they are too light in color and would not ship as they are too soft. But for a local market are all right.

Lovett's Early did not produce any good berries last year on account of plants getting too thick. This year with plants thin it is doing fine. Berries larger and of fine shape and color. It is not early, however, ripening with medium varieties.

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J. C. Evans.—There is one better than any other for all locations and markets, it is the Crescent.

C. W. Murtfeldt, St. Louis.—Wilson is too acid but carries well in shipping. Berries do not vary much on the market, but do as picked from the bed. Cultivate well with rows wide apart. Rainy nights and cool days are fine for berries. B. F. Smith of Kansas lays pipes for water to his beds and the crop gave three times as much money as without. Water is needed to lengthen the season. After fruiting a heavy mulch should be put on the cleaned ground.

H. R. Wayman.—We prefer our rows from four to five feet apart and the row itself not more than two feet, as the pickers are apt to get on the berries.

W. L. Culver.—Five feet apart is not too much. Allow no weeds at all, and the rows should cover three feet, leaving two for the pickers. Cut off the runners in August.

D. McNallie.—Five feet is all right for a garden, but is a waste of ground in commercial beds. The rows had best be three and a half feet apart, but narrow otherwise, the pickers destroy many berries by leaning on the vines.

Dr. Green, Chillicothe.—Glenn Mary is overwhelming and the Warfield a success. I have single rows two and a half feet apart, not matted, and the berries grow only on the outside.

J. C. Evans, Clay Co.—My choice is Crescent, Windsor, Capt. Jack and Gandy.

T. B. Chandler, St. Francois Co.—There are forty-six varieties grown on the Butterfield Experiment grounds at Farmington. Clyde and Ruby lead; Ruby is best of all. It is round, twice as prolific as others, bears longer and is sweet. The Ideal stands well, Crescent, Haverland and Warfield are also good.

J. T. Snodgrass, Howell Co.—List as follows: Excelsior, Clyde, Bismarck, Warfield and Aroma.

G. A. Smith, Livingston Co.—Clyde, Warfield, Bubach and Crescent.

W. L. Culver, Clinton Co.—Brandywine first; Wilson's Albany is also splendid.

T. R. Peyton, Audrain Co.—We plant Warfield with Beder Wood for fertilizer.

D. McNallie, Jasper Co.—Lady Thompson was fine this year though not so before. It ripens early and continues late. Haverland is first, then Bismarck, Ridgeway, Crescent is not good in size.

J. C. Whitten, Columbia.—Best are Michel's Early, Crescent, Haverland and Warfield.

H. S. Wayman, Mercer Co.—Strawberries are scarcely ripe in our section. This year we have Warfield, Crescent, and Lovett, with Brandywine and Bissell for late varieties.

Mr. Butler, DeKalb Co.—Crescent is the only good one this year.

Samuel Miller, Montgomery Co.—I prefer Parker Earle, Clyde, Excelsior and Pride of Cumberland.

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## STRAWBERRY CULTURE.

By S. H. Van Trump, Lawson, Mo.

Extensive experience as a working horticulturist has taught me that the strawberry is seldom profitably grown in this section of Northwest Missouri. Of all the growers that I have observed taking it up about here in the past fifteen or twenty years I can not recall a single one that has made a success of commercial strawberry growing. I have had considerable experience in strawberry culture in Central Missouri and know from actual experience that the degree of success that attended my labors there was much greater than that since I came to Ray county. I believe that these varying results are due almost entirely to the condition of the natural soil. In Northwest Missouri our soils are heavier and not so well drained naturally as in central and southern sections of the State. And while our soil here is possessed of unusual fertility yet it lacks warmth and friability, essential elements in successful strawberry culture. We think, then, that the remedy for the average soil hereabout will be found in artificial drainage—tile drainage. Then in addition it will, no doubt, be greatly benefited by subsoiling and incor-

porating into its depths a large amount of sand and gravel. Of course, we have some soil here that furnishes all these conditions almost perfectly; but this kind of soil is nearly always found lying adjacent to streams and, on account of its liability to overflow, can not be used in growing fruit. The primary and essential element in strawberry culture is a soil deep, light, warm and possessed of abundant fertility. A soil very poor in plant food elements but possessed of the desired physical qualities can very easily be made perfect by the addition of liberal quantities of barnyard manure. It is very doubtful if a soil, such as we have described, can be made too rich in nitrogen, which is the life of the strawberry, and will always show its presence in the soil by a splendid growth of fruitful plants—provided the soil is neither wet nor cold.

Having secured, as near as may be, a perfect soil, the preparation and future culture should be thorough in every detail. Let it be plowed to the full depth of the fertile soil and pulverized and fined to the last degree.

We prepare for setting plants by marking off with a three-rowed marker. We set in checks 3 1-2 by 2 feet, and cultivate with a Planet, Jr., plow, running between the rows each way once each week until the first of June. Then we allow the plants to form matted rows and cultivate only the wider spaces. We always endeavor to get a good stand of plants by the first of July, say from 6 to 10 good, strong plants for every original plant. After this we allow no runners to form, and endeavor to keep a fine mulch of soil around each plant, to retain the moisture. The main object in continuous shallow cultivation is not simply to destroy the weeds, but to retain moisture and carry the plants through the drouth conditions of August and September, and see them enter the winter strong, healthy, vigorous and deep rooted. Much of the culture around and between the plants we do with a hoe or steel rake.

We have fruited many varieties, but have found nothing better adapted to varying soils and conditions than Warfield and Crescent for imperfect and Robinson for perfect flower.

For about three years now we have been greatly damaged by a kind of blight that attacks the most vigorous plants about the middle of June and continues to affect them throughout the growing season. I have never investigated this disease and have no idea as to whether or not it can be prevented. This season our berries have been almost half destroyed by the attack of either the "true" or "false" squash bug.

We have almost abandoned raspberry culture on account of anthracnose. But we believe if one would plant upon a perfectly well-drained deep, warm soil that raspberries can yet be successfully and profitably grown.

Blackberries we have successfully grown and find Snyder and Erie most successful; but Erie is now going down before yellow anthracnose.

Grapes.—Our experience with grapes has been quite extensive and the rot and low prices our worst enemies. We have never been very successful in controlling rot by spraying. This year, however, we are using a "duster" manufactured by the Hillis Bros., of McFall, Mo. We think that for some purposes it is a decided improvement over machines using liquid. It requires less than one-third the labor to dust a given number of vines or trees and the method certainly seems to be quite as effective as when liquids are used. Our best varieties are Moore's Early and Diamond, Concord, Goethe and Ozark. Matchless, another of the Burr & Stayman grapes, seems to possess much merit. We have one and a half acres in vineyard.

In plums our great disappointment has been in Japan varieties. Abundance and Burbank were almost ruined by winter of 1898. These plums are much subject to rot and blow off the trees easily. We do not consider them profitable. Wild Goose, Miner and Wolf and possibly Lombard and Shropshire Damson are safe. We have two and a half acres in plums which we have concluded to make a hog pasture of, as it seems the only way to hold in check the curculio.

Our peaches are mostly of the Elberta, and we have found it very tender in bud, and not profitable on account of small yields.

Pears.—Our last and greatest disappointment has been in Keiffer pears. In planting this fruit we felt that we were safe and strong,

but we have little else but disappointment and loss. Our first planting is now seven years old, but we have never had a crop of fruit, and the blight has almost got the plantation. We would not advise the planting of pears, except after testing the soil in a small way. To speak frankly, then, we have not found horticulture a very profitable business. I have put 10 of the best years of my life into it and find little left but a most costly experience. That others, situated differently and working along other lines, have reaped a happier harvest I well know, and rejoice in the fact.

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Prof. Stedman.—The insect referred to in the paper was not a Squash bug, and was beneficial, not injurious.

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## TALK ON MANAGING PICKERS.

By D. McNallie, Sarcoxie, Mo.

The main thing is to be a good judge of human nature so as to get those who can be controlled. Pickers should be seen personally and notified of the condition of crop and time of gathering. Have plenty the first ten days and increase as your berries increase, but not too many when berries are few, because discouragement and dissatisfaction arise.

In commercial beds, five bosses are needed for every 100 pickers. They should give their instruction kindly and insist on a uniform way of gathering and treat all with impartiality.

To avoid counterfeits in tickets the bank now issues aluminum in three sizes for box, crate and tray, which are redeemable at the bank or any store.



If the package is clean, the berries picked and graded properly the packers will have no trouble in telling where to put them. Have the crates well filled and graded, not mixed. One box below grade may condemn the whole crate when the association judge passes on it before loading into the car. We prefer square to octagonal boxes as no holes are left between into which berries may roll and be crushed.

Marketing is the most serious part. The growers haven't much to say but are at the mercy of the railroads, refrigerating companies and commission merchants. The choice of a car is made by the refrigerating company regardless of the packer's opinion. The routing is made by the railroad and cars often sent 500 miles out of the way. Then requirement for so many pounds in a car is unjust because the minimum is too much to carry safely. The top two tiers will spoil. The railroads do allow a car to be diverted from an overstocked market. Where associations are friendly the dangers of flooding markets are greatly reduced. There is an overproduction of a certain class of berries but this will regulate itself, for a man can not keep up unless he will grow fine berries. The solicitors try to get too many cars, and so spoil a good market by making it a dumping ground.

The State Society ought to get a law passed for routing our fruit, choosing the cars and reducing the minimum. The organization should influence the Legislature to pass these for the protection of the fruit growers.

Strawberries will do well on same land for several years. If the rows are kept level and clean they are good for five years. I prefer the second year of all the five.

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### STRAWBERRY BREEDING.

By N. O. Booth, Agricultural Experiment Station, Columbia, Mo.

A consideration of the subject of strawberry breeding is necessarily to a great extent a consideration of the general subject of plant breed-

ing. Plant breeding involving as it does a study of variation in plants and its cause, has been explored but little and is still a virgin field for investigation.

Plant Breeding.—While it has been known for years that there was a sex in plants the practice of pollinating a chosen plant with pollen from another chosen plant is even yet in its infancy. These parent plants are chosen on account of certain qualities which it is hoped to transmit to the offspring and a wise selection of parents is the secret of successful plant breeding.

Variation in plants is infinite, no two being exactly alike and this fact gives us an opportunity to select with certain objects in view, encouraging selected characters and suppressing others. These variations are of two general sorts; bud variation and seed variation. The first term is given to those varieties which arise in different parts of the same plant; each bud, and the branch arising therefrom never being quite like another bud, and its branch. Seed variation is that variation which shows in different plants when they have been propagated by seed. The variation in this latter case is almost invariably greater than in the former.

Plants vary from a good many different causes, some of which are known and some others beyond our knowledge; the one, however, which chiefly concerns us in this discussion, is dissimilar ancestors. A plant, like an animal, tends to reproduce the characters of its ancestors and if these be dissimilar, the offspring will tend to vary, taking after one or the other, or combining the qualities of several. Thus plants grown from seed will vary to a great extent in proportion as the parent types were or were not alike. Breeding dissimilar forms is commonly said to break the type; that is, it increases the tendency to vary. The breeding of similar forms manifestly has the opposite effect of fixing the type. This latter point is of great importance in breeding plants which are habitually propagated from seed, like our garden vegetables. Here, after a certain degree of improvement is effected, the type must be more or less fixed so that these qualities will be reproduced from seed.

But with strawberries this is not the case, for here, seedlings with

the desired qualities having been selected, they are then propagated by runners, thus reducing subsequent divergence to the comparatively narrow limits of bud variation. On account of the foregoing, it is not very clear what is meant by those who speak of their strawberries as being "pedigreed." In animals, when the term "pedigree" was first used, it indicated that all of the ancestors of the pedigreed animal for a certain number of generations, had possessed a certain degree of excellence and conformed to a certain type. The progeny of such an animal will undoubtedly be more apt to possess the type qualities than an equally good animal of mixed blood. If any such records are kept of strawberries, each grower must keep them for himself, and would indicate but little, for we have no data to prove that plants propagated by runners like strawberries are apt to vary because the seed type is variable. In plants habitually propagated from seed the term "pedigree," as indicating a certain fixing of the type, might possess value. But there is considerable danger in forcing analogies between the plant and animal kingdoms.

**Methods of breeding plants.**—The methods of breeding in plants are of three general sorts; first, the old method of simply selecting seed from plants showing best fruits. Here only one parent is known. This was the first method practiced, but it is doubtful if it can be called plant breeding. In such a case, if the plant be of the perfect flowering sort, the stigma may be either self or cross fertilized. The second method is to confine two different sorts of plants together so that they may fertilize each other. In this case, if one of the sorts produced pistillate flowers only or be self sterile then all the fruit produced by this pistillate sort will have the other variety for a male parent. The third method is to remove the stamens from the flowers from which fruit is to be saved, before the regular time for fertilization, protect the stigma from natural fertilization and then to hand pollinate with selected pollen later. The first of these methods is the easiest but the least satisfactory, as it gives only one parent. The second is probably the most practicable when it is desired to raise a large number of seedlings, of a given crossed parentage. The third requires the most labor and attention, but is the surest in its results. It is inferior to the

second, in that it does not allow for the natural selection of pollen; a multitude of crosses can, however, be made in this manner, with plants closely adjacent to one another, with greatest certainty of true parentage.

The Strawberry.—Our cultivated strawberry belongs to the Pine or Ananassa variety of *Fragaria Chiloensis*. The wild strawberry of this region, *F. Virginiana*, has given several varieties which were once cultivated, but are now discarded. The *Chiloensis* species grows wild in Chili and along the Pacific coast of North America.

The strawberry is what botanists call "polygamous," that is, it has perfect flowers on some plants and only imperfect or pistillate flowers on others. This fact is of considerable importance in breeding, because a pistillate sort can be selected for one parent without danger of self-fertilization.

There are five general qualities requisite for a good market strawberry. Named in the order of their importance they are: first, Vigor; all other good qualities count for nothing without a certain degree of vigor. Second, Productiveness. Third, Good size and color of berry. Fourth, Good flavor. Fifth, Firm texture so as to stand shipping. To these, two more might be added; capacity for making new plants and resistance to rust.

The fact that so many points of excellence are desired is the reason why it is so infrequent that a variety of real excellence is introduced.

There are a good many points on which further light is desired in regard to strawberry breeding. First, Is the type of our cultivated strawberry so well broken up that further crossing is undesirable? Second, In a given number of seedlings what per cent will probably show merit and what varieties will give the highest number of valuable seedlings? Work along these lines has been done by several of our experiment stations, notably by the Geneva, New York and the Missouri Stations. The question as to whether seedlings from cross fertilized berries are better than those self-fertilized, does not seem to have been thoroughly demonstrated. No systematic experiments have been carried on to determine this point. It seems to have been generally taken for granted, however, that crosses are most desirable

possibly without sufficient evidence to support the conclusion.

In the work done at the Missouri Station, four pistillate sorts which are necessarily cross fertilized, Warfield No. 2, Lady Rusk, Crescent and Bubach No. 5, gave an average of 5 per cent of seedlings of sufficient merit that they were considered worth saving beyond the first bearing year. Gandy, the only perfect flowering sort used as a female parent, gave only .6 of 1 per cent. The number of varieties here is certainly too small to justify any sweeping conclusions, but the figures tend to show that the general supposition is correct and that the cross fertilized seedlings are best.

The second point, as to the per cent of meritorious plants to be expected from seedlings and the varieties giving best results has been more fully investigated. The merit necessary in a seedling in order to deserve recommendation for general cultivation may vary with different propagators, but I think everybody agrees that the seedling ought to be better in most, if not all respects than the parent; and better than every other variety for the particular purpose for which it is intended. There is no advantage in adding to the already long list of varieties of strawberries on the market unless the sorts added are better for some purpose than anything now cultivated.

At the New York Station 1,000 seedlings were reported as having fruited in 1888-89; out of this thousand only twenty were thought to be worthy of further testing. Seven hundred and fifty additional seedlings were fruited in 1890, and fifty saved after the first year. But by 1893 it was considered that none of these 1,700 had shown the merit necessary for introduction to general cultivation and they were all destroyed.

At the Missouri Station in the year 1892-93, 4,300 seedlings were fruited, 209 of which were saved for further trial. After eight years of continual culling, four of the seedlings have shown a considerable degree of merit and are being tested in other localities. Some of these may be of commercial value. From these figures it will be seen that the chances for securing a new variety of sufficient merit for general cultivation, is less than one in a thousand. This does not seem very promising, but it is well to realize the facts and appreciate how seldom

varieties of real, lasting value are originated.

The question as to the best sorts to secure seeds from has not been tested for many varieties, but a little work has been done along that line. It is a difficult, slow piece of work requiring long, painstaking effort. In Missouri the four varieties, Warfield No. 2, Lady Rusk, Crescent and Bubach No. 5, gave seedlings of which about the same per cent (5 per cent) were considered worthy of saving beyond the first fruiting year. Of the four now showing the most promise, three are from Crescent, male parent in all cases unknown. In the results of the handcrosses, Crescent X Sharpless gave an exceedingly high per cent of good seedlings, both in Missouri and New York. In the work done by the New York Station the Crescent showed a decided lack of of prepotency—the seedlings from this variety usually resembling the variety from which pollen was secured. The Geneva Station reports Johnston's Late and Sharpless as their two most promising pollinators, the seedlings resembling the parent plant and possessing a high degree of merit. These are a few of the most important investigations which have been carried on. There is still room for further work.

The conclusions to which we are forced are: That strawberry breeding and the origination of new varieties are such technical subjects, requiring so much knowledge of strawberries and plant breeding, that they will probably be left to the expert rather than to the general grower. The work is usually great and the reward little. Within a year or two a valuable new variety is in the hands of all dealers and the originator ceases to derive any profit from it.

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## WHAT TO DO WITH OLD STRAWBERRY BEDS.

By John F. Bartels, Neosho, Mo.

A good many growers depend upon the second, third and even fourth crop of their beds for profit. Should this be so?

As far as I have experience I maintain that more than two crops should not be expected of any bed. As a general thing so many noxious weeds get the start in an old bed, that affect both quantity and quality and make the second renewing unprofitable. I have given this matter some attention and I think hereafter I will renew no beds after the second crop.

A grower who has his own plants can plant in the spring and have a nice new bed coming on with but little more labor and expense than renewing, and yield and quality will be much better. A little figuring ahead will do away with a great many unprofitable pickings.

I believe a bed after first fruiting can be made almost equal to a new one if done in time and properly. I will give my plan of renewing. I do not claim it as perfect, yet I have been very successful in using it and it will work well in every section of country. After picking, as soon as possible I start the turning plow, block off first row, open a good furrow on each side, throwing the dirt away from row, cutting row from eight to twelve inches wide, according to number of plants. I follow these furrows with a bulltongue plow—subsoil good and deep. This crumbles dirt enough in the row to cover up all small weeds. Skip the second row and treat third row like the first one and so on every other row in the field. After this harrow level the ridges as much as possible. Treat all unworked rows like first and harrow to finish. All high weeds in row can or should be pulled as soon as possible. This is almost equal to a light hoeing.

I find it quite an advantage to cross-plow after this with a double shovel (narrow shovels). Where the row is light the operator can dodge and save nearly all plants and wherever too many plants plow them up.

There is no disadvantage in leaving a rough surface—rather an advantage in hoeing and further cultivation. Cultivate deep. I find no advantage in using a mower or burning. This work applied as outlined will almost complete the renewing.

I would like very much to hear from others on this subject. We can learn how to do things right by studying different methods.

## NOTES ON VARIETIES.

By B. A. Barnes, Trenton, Mo.

I thought that maybe a few notes on the strawberry crop would be interesting to the members of the Society. The prospect for a good crop of strawberries was very flattering all the spring, but the final results will not be as satisfactory as was expected. Most of the berries in this section are small and the yield is not good. The cause of this I do not know. For the first time in twelve years I am bothered some with rust, and that may be the cause of our partial failure. Will spraying with the Bordeaux mixture prevent rust on the strawberry? The rust in my patches is in a few small spots only and I can see that the yield in those spots is not nearly so good as on the other parts of the same patch. Warfield rusted the worst. In point of product the Warfield takes the lead closely followed by the Lovett which is a fine berry and the best fertilizer I have found yet for early varieties. Haverland is yielding a good half crop. But the Clyde is almost a total failure and what few there are rot before they get ripe. It will have to go where the woodbine twineth, if it don't behave better next year. Glen Mary is ditto with Clyde and will also have to be counted with things that were. These two last are quite a disappointment to me for I expected something extra fine. Windsor Chief is bearing a fair crop. This is really a fine berry if left long enough on the vines. Now I want to know what is the best late berry that is large and productive?

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Discussion.

F. Holsinger.—Best berries come from the two year old beds. Mulching should be quite heavy.

C. W. Murtfeldt.—The merit of flavor should be first.



Dr. J. W. Green.—There is danger in using straw a second time as a mulch, because the fungus which gets into the straw will be carried back to the plants again.

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## OUR NEW EXPERIMENT STATION.

By Director J. T. Stinson, Mt. Grove, Mo.

The Station was established by the Legislature last winter. The committee appointed, located it in the center of the Ozark country, one mile from the depot at Mt. Grove. The town donated one hundred and ninety acres to this new State Station. The site for the buildings is fine, the land good; there are enthusiastic fruit growers along the line of the railroad, who are interested in this undertaking, and all is promising for good work. The buildings are now under way; two residences, the barn and Experiment Station will be completed by winter. We have ten acres planted in one hundred varieties of peaches, as many of apples and some grapes and berries. Experiments are being conducted in Dr. Lane's orchard toward finding remedies for apple scab and bitter rot.

A number of varieties of cow peas have been planted for trials in cultivation.

In our attempts to originate new varieties we have obtained a few hundred plants of which we know the parents and may find one or two apples of value to South Missouri.

We will work in harmony and co-operation with Columbia so as to accomplish much more. We want the assistance of the Horticultural Society and need suggestions to help us to avoid wasting time and money.

The scab on unsprayed trees is quite bad in South Missouri now. In Arkansas last year we succeeded in preventing it on twelve-year-old Ben Davis trees. Also same for scab and rot on grapes. Spraying

with Bordeaux should be continued until the apples are good size, as the first of July or later.

On the twenty-third of June we will have the ceremony of the corner stone laying and hope to see many of you present.

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A. Nelson.—Bitter rot is worst on R. I. Greening and Willow Twig.

Dr. Green.—From twelve or fifteen Willow Twig trees seventeen years old I have never had one dollar's worth of apples. This year I tried ten bushels of ashes around each and have the first now without scab.

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### SOME VALUABLE SHRUBS.

By H. S. Wayman, Alvord, Mo.

Inasmuch as I have been asked to write a paper on the subject of valuable shrubs and to assure you of our worthy secretary's good judgment in selecting one so thoroughly competent to handle this subject I need only say that I am a nurseryman.

You know we nurserymen know it all. We explain to you the various characteristics and peculiarities, the relative merits and demerits of all plant life. We tell you what to buy, when to buy and last (but by no means least to us) how much to pay. We tell you of the luscious fruits and beautiful flowers that will adorn your trees and plants. We manifest a deep interest in your success. We build up in you most sanguine hopes and in the height of your expectations and

fondest hopes we sell you the trees and plants and verily get our reward, whether you do every time or not.

There are a few things we do not tell. We don't tell you of the handsome profits that frequently attend the sale of our stock. We often neglect to tell you that many of our most beautiful ornamentals which we sometimes sell you at fabulous prices are produced for a trifle more than the expense of digging them up.

But what of that? Is not that our privilege, and are we nurserymen at fault for your ignorance of these facts? For your neglect to spend a few spare moments occasionally reading such editions as the reports of our State Horticultural Society and the Western Fruit Grower whose pages are full of valuable information and which should be in every home in our land?

The real value of a shrub to the average planter is not measured by the cost of production or its money value in the nursery or listed catalogue, but rather by its beauty and fragrance and for this class of planters I will mention what I consider most suitable.

The rose will always head the list yet they are ideal only in bloom and fragrance for the bush is unsightly and we would rather plant them in the back ground or in hedges.

The flowering almond is desirable because it blooms early and freely.

The lilac should always be a favorite, as in addition to its profuse and perfumed bloom it has a fine foliage and is perfectly hardy, valuable for spring blooming.

The flowers in demand for the thirtieth of May are the snowball, weigelia and tree honeysuckle. Though they are not fragrant they are showy and sure. The early blooming varieties of roses are at their best at this time and are indispensable for decorating purposes.

Japan flowering quince is a beautiful shrub which grows just high enough for a low hedge about a lawn and has dark glossy leaves and a satiny flower either crimson or white.

The hydrangeas, though not so common as many of these, are of surpassing elegance and beauty.

Vines may not be regularly classed with shrubs yet they harmonize

so perfectly that you should not neglect to plant a few such as wisteria, a choice plant for ornamenting a cottage. It is very hardy and its sparse foliage admits considerable sunlight which prevents dampness and decay of the building and its light purple bloom which appears late in the season makes it a valuable addition to the list.

For a stone or brick building I would plant the European ivy. It is not a very common plant but I know of no apology for its neglect. It is easily grown and its adhesive nature and thick garniture of foliage makes it perhaps the most valuable of foliage plants.

The honeysuckle should not be left out and is suitably grown on trellis the same as the climbing roses of which the *Prairie Queen* and *Baltimore Belle* are two of the most common hardy and reliable.

Clematis is a beautiful vine particularly in bloom but not so hardy.

A wild grape vine or two adds a very natural and graceful effect.

A few evergreens of dwarfish growth adds materially to the interest and beauty of your grounds, the most popular being the *Irish* and *Trailing Jumper*, *Hemlock*, *Cedar* and *Arbor Vitae*. With an occasional interference of the artifice they can be kept to the proportions of a shrub and if necessary I would waive the rules of classification and add these to my list of valuable shrubs.

These are by no means all that are worth planting but simply among those I consider most suitable and especially so for people whose time and opportunity for the care and enjoyment of flowers is limited. Many of the new and rare shrubs are as good or better than those our grandparents loved, but the general public will not appreciate them fully until they become acquainted.

Our flower friendships are like the human in some respects. They must be known and loved and associated with our best thoughts and happiest hours to be valued most—hence plant and study and learn the habits and peculiarities of as many as possible, but don't plant more than you can care for properly. Don't try to have everything you see in the florist's garden. Ruskin says "It is better to know the habits of one plant than the names of a thousand and wiser to be happily familiar with those that grow in the nearest field than arduously cognizant of all that plume the isles of the Pacific or illuminate the moun-

tains of the moon."

If you will direct the selection, planting, culture and care of your ornamentals by a careful study and a thoughtful mind your lawn will be "a thing of beauty and a joy forever," your "home, sweet home" and your song will ever be "no matter where I roam, I'll not forget my home."

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Discussion.

Wm. H. Barnes.—Weigelia is a favorite of mine and also Wisteria so suitable for high points.

Mr. Butler.—I would add Althea.

C. W. Murtfeldt.—The dollar is not almighty; the poetic and religious are also well considered. There is an exhilaration felt in the first springing of flowers. When the grass springs and the crocus appears I thank God that I can see it. Hyacinths come next to Crocus, all shades of red, white and blue. Tulips and Jonquils are next in turn. The bulb bed should be rich and is practically permanent as the bulbs need to be renewed only once in a while. The flowering cherry is ephemeral but beautiful. Of roses the Jack is handsome and luxuriant in bloom. Paul Neron and Empress of India are fine. There are three or four shades of the Rambler and a plant will bear a thousand buds at a time.

On motion the session adjourned until 2 p. m.

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THIRD SESSION.—2 P. M., Wednesday, June 6.

Immediately after the call to order the following committees were announced:

FRUITS—

D. McNallie,  
T. R. Peyton,  
F. Holsinger.

FINANCE—

J. C. Evans,  
J. C. Whitten,  
H. S. Wayman.

FLOWERS—

N. O. Booth,  
Miss Emma Park,  
Miss Eda Sutermeister.

FINAL RESOLUTIONS—

J. M. Irvine,  
J. T. Snodgrass,  
T. B. Chandler.

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RASPBERRY CULTURE.

By T. R. Peyton, Mexico, Mo.

A fruit that has grown wild in the forests for centuries, and which was enjoyed by our forefathers from generation to generation, is to-day being cultivated throughout the country and prized as one of the best members of the family of small fruits, and can be found on the market in nearly every city and town in the United States selling at higher prices than any other berry on the market. My reasons for writing thus are: First, when berries are ready for market they are already prepared for preserving or for the desert dish; second, the quantity

of sugar required to sweeten them is very small compared with many other berries; third, the demand always being greater than the supply, makes it one of the most desirable berries on the market.

I do not want to consume too much of your time on this part of the subject, therefore I hasten to the growing, in which I presume many of us are more deeply interested. First of all I wish to mention is the location, which is the first step to be taken after we arrive at the conclusion that we want a raspberry patch, the prime object being to select a piece of loose, rich land which slopes either to the east or south, thus protecting them from the extreme cold weather that usually comes from the north and west. Therefore I would prefer an eastern or a southern exposure for best results, and especially for the tender varieties.

The climate has much to do with growing the raspberry, as with all other fruits. We would no more think of going to North Dakota to grow raspberries than we would to grow peaches, though they are much hardier than the peach and will do well over a greater portion of the United States. The southern and central part, however, is better adapted to this fruit.

We had a small patch of Columbian Red which passed through 33 degrees below during the winter of 1899 and bore some fruit that season. They have revived and seem to have entirely overcome the injury from that unusually low temperature and are loaded with fruit this year.

As to the distance apart plants should be set, people differ, as in planting all other fruits. I prefer planting 4x6 feet. Ours, being planted in an orchard, are 5x7 1-2 feet, so as to cultivate both the berries and trees to better advantage. Mark off the ground either with a diamond or a single-shovel plow. Grout the roots in a paste-like mud or carry them in a bucket containing enough water to cover them until ready to set, as the little fibrous roots are so tender that a few minutes hot sun will kill them or weaken the plant, thus causing a very feeble growth. Keep the ground thoroughly stirred after planting, so as to prevent any weed growth from starting. This can be very easily done by breaking the crust after each rain with a shallow running plow or spring-tooth harrow. When canes grow to a height of 18 or 20 inches

pinch off the tops in order to cause them to throw out side branches and become more stalky.

In selecting varieties, note what the different kinds have done which have been tested in your locality, and plant more largely of those which have done best. It is well enough to test new varieties from time to time, as each fruit farm is an experiment station. Should these new varieties prove profitable you then have confidence in them and will give them much better attention than though you were laboring under uncertainties. The horticulturist should ever remember that old adage by Davie Crocket, "Be sure you're right, then go ahead," because when a mistake is made in a fruit plantation it costs a great deal of time, labor and money to correct it. There are a great many good varieties, all of which I presume will do well if we are fortunate enough to find their locality. But local environment has a great deal to do with all kinds of crops, especially fruits.

Thus far we have not tested a great many varieties, but will name a few which have been profitable with us, namely: Kansas, Gregg, Ohio and Columbia-Red, but my choice of these is Kansas and Gregg. The Evans, having been recommended to me so highly by the originator, Col. J. C. Evans, I purchased 1,000 plants of him while at the meeting at Princeton last December and planted them this spring. This is a very promising variety, from what I have been able to learn. We are also testing the Mohler and the Older, both of which come highly recommended and are profitable in the extreme eastern part of the state near the river. The Palmer is also profitable there, but we have not tested it. I think, however, that it will be equally as profitable with us, as we are only about 50 miles west of where it is doing well.

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## RASPBERRY EXPERIENCE.

By N. Butler, Darlington, Mo.

A number of years ago a friend sent me a box of miscellaneous shrubbery, among which were some raspberry plants.



Not being interested in small fruit growing at that time, I set them out in a hap-hazzard way, almost begrudging the time and ground they required.

I got the rows too close together, but they struggled along till I began to like the business. I got plants from any source, and soon found that I had a mixed lot, with a fine hill of berries here and there through the patch. I did not know they were different varieties, and gave the poor ones extra care, hoping they would bear superior berries next year, but with the same result. I then made a careful study of the wood and leaves of my 1,600 hills and found about 200 hills of one variety that were superior to all others. These I marked by means of the stakes, for I supported the hills that way at that time which I found too expensive.

After picking, I grubbed out the poor varieties and put down the tips of the 200 hills of superior berries. I got enough plants from these to set out 300 rods the next spring, and the next year I sold \$150 worth of large black-cap berries, of uniform size from these and the 200 hills of old plants.

Since then I have put out 200 rods each spring from the tips of my youngest hedge, till I now have 1,200 rods over one year old.

My raspberries do best on a north or east slope in hedges running north and south. I have them in my apple orchard, and find those in the shade are best. I put as many plants as I can get in the apple tree rows, and two rows between the apple tree rows. I plant in close rows so they will resist the wind and shade the ground under the hills, and so that they will hold all leaves or other trash that may accumulate and serve as mulch, and so the pickers will not tramp near the hills by crossing the rows. I put down the tips of my youngest hills about the last of August, or when nature begins to cause them to take root. I do this by digging a little hole and covering about six inches of the tip so that the end will not grow out. The next spring I leave a six inch cane on the roots and plant about two feet apart in a good furrow in March if the weather will permit. I fill the furrow with loose earth, and trust to nature to do the settling, as tramping is liable to injure the delicate crown.

These canes should be straight in the row so as to cultivate them till the plants appear to guide the work. It is early cultivation that insures a good stand of raspberry plants. Never allow the weeds and grass to get a start and, you can cultivate and hoe an immense patch in a day.

When the plants are one foot high I pinch off the top to make a stocky bush, and to keep them from vining like dewberries.

The next spring, I cut off side laterals to twelve inches so they won't interfere with cultivation. I tie all long limbs to plants ahead in the row, to get a greater bearing capacity. I cultivate early and often till just before picking. I scatter a little straw along the sides of the row to keep mud from spattering on the berries during heavy rains. I then cultivate between the straw as before. After the first year I pinch the new growth off to eighteen inches, and cut all laterals off the next spring to twelve inches. Never pinch the laterals off the new growth.

After the first year cut out the old wood just after picking, and burn it to prevent disease.

A little mulch around the hills is beneficial, but I cultivate between the rows so as not to remove the mulch. I find the old wood of the first years growth does no harm, but helps to catch leaves and snow and support the new growth.

Since I can produce a desirable berry, I have a good market at my own ranch. To prepare for this I order my box and crate material from Sandusky & Co., St. Joseph, Mo., and have it made up and the boxes placed bottom side up in crates to keep them clean before berry picking begins.

I save my carriers and some of my crates from year to year. The carrier holds six boxes. I put stands up in the shade at the end of rows, next to the house to place the crates on during the picking season, usually in the shade of apple trees.

I get girls and women living in my neighborhood to pick the berries, and pay them so much per box in berries at the market price. I find who are good pickers and employ them from year to year during the fruit season.

To keep account of the picking I have a blank book, and write the picker's name at the head of a page when he begins. I already have a column of dates covering the picking season on the left of the page. Each time I take up his boxes to fill an order I place the number opposite the date and at night carry the amount to the right hand column on side of the page opposite the date.

At the end of the picking I add the right hand column which gives the whole amount. If a family is working together I put the family name at the top of the page and proceed as with the individual.

My pickers usually wait till they earn a crate before receiving pay, so it is a simple matter to keep the account in this way.

No stems, leaves, or faulty berries are placed in the boxes, which are rounding full, and no moldy berries are allowed to enter the market. This insures ready sale, and steady customers and some clear money.

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## PLANTING RASPBERRIES.

By A. Taylor, Harrisonville, Mo.

By request of our worthy secretary I will try to give a good description, first, how to prepare the land for planting of a field of raspberries. Take good strong corn land and plow it at least eight to ten inches deep in the fall. If run together by rains replot in the spring before setting them. Mark the land north and south in rows seven feet apart. When the young plants are from six to fifteen inches high in the spring set them three feet apart in the rows and about four inches deep. Don't forget to tramp the dirt well around the plants with some loose dirt on top to prevent baking. Keep the land well cultivated to keep down all growth except the raspberry plants. When the plants are from two to two and one-half feet high pinch off the tops so as to make the laterals grow out in good shape. For a

fourth of a crop the next year do not let more than two canes grow from each hill the first year. The second year give plenty of shallow cultivation to keep down all weeds and grass. Grow from three to four good strong canes to each hill and be careful to take off all surplus canes. After fruiting is over cut out all old canes of last year, gather them up and burn them to get rid of any insects that may be trying to get into winter quarters in the old canes. Don't forget to top all the new canes at two to two and one-half feet high to make them throw out laterals for fruiting the next year. Be careful to take out all old wood after fruiting is over and never let over four canes remain in each hill and always keep the field clear of weeds and grass. Don't expect to make a fortune in a year or two for you will not average one to one and a half boxes to the hill. Planted as directed you will have 2,074 hills to the acre, and from forty to ninety bushels of berries per acre if they do well, which they don't always do. In regard to pruning I prefer the spring of the year after the buds first begin to start. Then you can tell better how close to cut back the laterals which should never be over fifteen inches long and ten to twelve inches is better, unless the canes are extra strong and healthy. Cultivate on the level plan. It is the best and when your field has been bearing for five years plant another if you haven't already got disgusted with failures and low prices.

The idea of letting the plants get a good start to grow before setting in the spring is one of my own from experience. I had set one spring 7,000 plants ranging from six inches to two and a half feet high and I lost but very few plants. The largest I topped before setting and pinched off the leaf at the end of the stem and not one in a hundred ever wilted after the first day of planting. If this is worth reading at the June meeting, read it. If not drop it in the waste basket, which I expect will be its fate.

## Discussion on Raspberries.

F. Holsinger.—The Cumberland is better than any named; it is larger than Kansas. The Gregg stands next. The Cardinal is a heavy bearer and thrifty grower.

Prof. Smith.—Raspberries are a failure here on account of anthracnose. Souhegan and Ohio do best here. The Kansas promises better. London killed back badly, Turner proved more hardy.

Samuel Miller.—The Cumberland came from Pennsylvania, is large, handsome, good flavor, productive and hardy. The Cardinal is beautiful.

J. C. Evans.—I have twelve acres of a new variety, looking fine. This "Evans" yields two quarts to one of any other.

Emma J. Park.—In Springfield Progress and Kansas are favored.

L. A. Goodman.—Anthracnose destroyed many plants in South Missouri, so that we have only a fourth of a crop on the patches in general. We are trying to check the disease by using a dust spray of Bordeaux Mixture. This proves most effectual by holding the nozzle to the crown and a foot high.

N. F. Murray.—On four acres planted with Hopkins, Gregg, Kansas and Conrath, all winter-killed except Kansas and Gregg. But even after the hard winter the crop netted fifty dollars per acre.

H. Van Schrenk.—To keep anthracnose in check cut out the diseased canes and burn immediately. The fungus grows in the spring and summer; the spores fruit in September, October and November when the wind and rains carry them back to the plants.

Prof. Whitten.—The way to exterminate the disease is to burn the canes and neighbors should cooperate in fighting it. In spraying with Bordeaux, the mixture used before the buds start may be strong, but after the growth begins it should be half as strong. Cutting out the infected canes and spraying will hold it in check and eventually kill it out, though it exists even in the crown, on the new parts below ground.

## PLAY AND PROFIT IN THE BLACKBERRY PATCH.

By J. H. Karnes, St. Joseph, Mo.

That there is more or less profit in the blackberry patch is conceded by all who have tried growing them, either for home use or the market. But the amount of profit when grown for market depends largely upon the varieties grown and the manner in which they are, or may be, handled or put upon the market; also the number and varieties grown.

Where one has a sheltered location and will further protect the plants by mulching late in the fall or winter, the Early Harvest has proven quite profitable to some growers. It is a pretty good berry and its extreme earliness brings it into the market at a time to command the highest price. I do not recommend it for general cultivation, but only to those persons who can and will give it proper protection, for it is not entirely hardy and often winter kills badly, yet I have known as many as three good crops in succession. I only say: If one can raise the Early Harvest it will increase his profits.

After the Harvest comes the Snyder, which, like the Ben Davis apple, is the reliable and best commercial berry grown. It succeeds well everywhere. It lasts almost a month and is succeeded by Taylor's Prolific—a remarkably good berry, but a hard one to pick because of its many thorns and its tendency to produce its fruit under the foliage. It succeeds best on rather thin soil. The laterals should not be pruned as short as the Snyder.

I have tried Minnewaska in a small way and like it pretty well. Some of my friends give it high praise. It is a large, late berry and sells well in any market. It is not quite so hardy as the Snyder or Taylor's Prolific.

There may be other varieties worthy of trial, but the four already named seem to be the best for this locality and afford the longest season one can secure for the blackberry.

All berries are sweeter and better if grown in some shade. They should be fully ripe before they are picked for market. If picked

too green they turn red in the box and neither keep nor sell as well as when picked fully ripe.

I usually give the berry patch about the same cultivation that I give the cornfield. Many fruit growers in this locality have been sowing clover in the berry patches and vineyards, and they think that plan much better than so much cultivation. The plants seem to thrive well in clover, and there is less washing of the land. Then in clover they only have to prune and pick.

Last week I visited a very successful grower of blackberries. He grows berries and clover in his orchard with remarkable success. His patch of three acres produced a full crop of berries last year when almost all other patches were injured by the severe winter; and his trees in the berry patch were larger and more fruitful than were those where berries were not grown and had had better cultivation, showing conclusively that berries are no detriment to the growth or fruiting of the orchard, notwithstanding a very prominent member of this society said: "One-half mile away is close enough to have blackberries to the orchard." After ten years' experience with blackberries and raspberries among fruit trees I do not hesitate to recommend the practice. And the man with a small number of acres who desires both tree fruits and either blackberries or raspberries can plant both on the same land if he wishes, being assured that the berries will be greatly benefited by the shade from the trees, which will be fed and stimulated by the berry plants, and each protected by the other during the winter.

Now, as to the manner of disposing of your fruit so as to receive the largest profit: My plan is to get as close to the consumer as possible. For several years I have had but little business with the local commission man or retail fruit dealer, but instead I run a retail wagon of my own, selling direct to the consumer. I have, in the last six years, built up a large trade among the best families of the city. I have no trouble in getting the highest prices in the local market. I also do considerable shipping and find my best markets in our thriving country towns. Of course I can not reach the consumer there, so I place my fruit with some reliable dealer, who handles my fruit exclusively. For several years I have disposed of my berries and fruit in this way, mak-

ing my sales easily and getting larger profits than many of my neighbors who depend entirely on the local dealer and commission man.

Put nothing but the best fruit on the market.

Keep as close to the consumer as possible, and whether your crop be fifty crates or a thousand you may be assured of a good profit from the blackberry patch.

Did you say something about play in the berry patch? Well, it takes about five months of pretty active work in the berry patch, and that's all I know about it.

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#### Discussion on Blackberry.

C. W. Murtfeldt.—The evil effects of drouth in July and August can be overcome and the moisture preserved by keeping a mulch on the rows.

T. R. Peyton.—Red rust is a troublesome pest in our parts.

F. Holsinger.—Rust was introduced to get rid of the blackberry which would otherwise cover the whole country.

Prof. Whitten.—The Red rust is a parasitical plant and has two forms in life. It germinates on the roots where it looks like anthracnose, this then matures brown spores which grows up into the stems as a mycelium thread which comes out as the red rust. Root and branch of the infested plants must be pulled out and burned. Spray early and then also after fruiting. If badly infected the vines should be destroyed and new ones planted in another part.



## FORCING LETTUCE UNDER GLASS.

By B. A. Barnes, Trenton, Mo.

I approach this subject with a feeling that I can not do it justice having only had about three years' experience, and that is only time enough to get a good start. But I will give my experience and methods, and possibly it may induce others who are located near small cities of three thousand people or over to engage in this business and supply the local market with fresh vegetables grown at home. Our grocery-men here—and I presume it is so everywhere—prefer to buy good home grown lettuce or other vegetables, rather than to send their money away for stuff which is stale and hardly fit to be eaten. Their customers will eat more and be better satisfied than if they had to eat shipped stuff, even though the latter cost them less money.

In starting, the first thing to do, if one can not have a regular forcing house heated with a furnace, is to procure sash and glass. I make my own sash. They are about 3x6 feet glazed with 10x12 glass. One can have as many of these as his pocket-book will allow. The frames on which the sash are to rest are made in a good many different ways. I use a double range hot bed with a narrow walk between and am indebted to Prof. J. C. Whitten for the plans. I like them well, but it is useless for me to go into details about their construction. Neither is it necessary for me to describe the manner of making a hot-bed as that is well known to everyone. But I will say that the more solid the manure is tramped the longer and steadier will be the heat.

The soil in which the plants are to grow should be well pulverized; if it is sifted all the better. It must be made very rich and for growing lettuce should be rather heavy. Radishes will thrive in a lighter and more sandy soil.

Sow the lettuce seed in rows from three to five inches apart across the bed, and after it is well up thin, so the plants will stand from three to four inches apart. Right here let me say that one of the hardest lessons a gardener has to learn is to know how to thin young plants properly. Plants that stand too thick in the row will not grow as

rapidly or mature as quickly as though they stood the right distances apart. This applies to outdoor gardening also.

About all there is to do now to secure a good crop of lettuce is to give good ventilation, cultivate thoroughly and water sufficiently with warm water. It is very important to have the water warm, as cold water chills the plants and they will not grow as rapidly as when warm water is used.

It is better to have the frames as nearly air tight as possible, and if the sash are raised on bright days for ventilation, it is well to close them before the sun gets off the beds. This will keep the warm air in the beds and the danger of frost will be greatly lessened.

In very cold weather mats of some kind to keep the frost off the glass are indispensable. I use old carpets, which can be bought very cheaply at the second-hand stores. These answer every purpose. It would be well also to have shutters of thin, soft fine ceiling, made to fit the sash, or have wide boards as additional protection, especially in hail storms.

Varieties.—I use the Grand Rapids forcing. This grows rapidly and looks well. Denver Market forcing is a good lettuce, but no better than Grand Rapids. St. Louis Butter is a good, smooth lettuce, but it does not suit our market, which calls for a curly lettuce.

As to the money to be made; I will simply give the figures for this year and you can draw your own conclusions. From 54 3x6-foot sashes I marketed \$162 worth of lettuce at 15c per lb. This is \$3 per sash. Of course it takes work and there is some exposure to the cold and storms of February and March. But the work comes at a time when the gardener is not very busy and I know of nothing that will pay better for the amount of time and labor expended and money invested than growing lettuce and other vegetables under glass.

What I have written may sound silly to the old veterans in the business and I want them to pick this paper to pieces and criticize thoroughly for I am in the business to learn, and if I am on the wrong track I want to be righted; if my methods are wrong I want them corrected.

## Discussion.

Prof. Whitten.—There are larger returns for the money and time invested in vegetables grown in winter than almost any other business. The best place is around small towns, to which no stuff is shipped. Shipped is very inferior to fresh stuff anywhere.

Forced vegetables are a source of income to the Horticultural Department at Columbia. By intensive cultivation three or four crops can be grown at once. We have cauliflower eighteen inches apart, lettuce eight inches each way between that, and radishes and water cress between the lettuce. As much lettuce grows as without the cauliflower; it comes after the radishes and cauliflower after that. Cauliflower should be transplanted when about eight inches high. Lettuce grows to a large head in three weeks after transplanting, but half its life is passed in a small space which means economy of heat and glass covering. The cress grows finely under the shade of the cauliflower with plenty of water.

G. P. Turner.—I have tried sweet corn under glass. It is hard to transplant as the growth is thereby checked, but still it comes earlier than ordinarily though it is dwarfed.

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REPORT OF BUTTERFIELD'S NURSERY AND EXPERIMENT  
STATION AT FARMINGTON, MO.

By T. B. Chandler, Secretary St. Francois County Horticultural  
Society.

To the Missouri State Horticultural Society:

We have 46 varieties of strawberries on our Experiment Grounds, and have watched them all very closely, and consider them best in the order named:

Clyde is the best all-round berry, with Ruby second, then Bubach, Cobden Queen, Seaford, Lady Rusk, Excelsior, Gardner, Isabel, Aroma, Pride of Cumberland and Gandy. Excelsior is three days earlier than Michel's Early and fully three times more prolific.

Owing to the exceeding dry season of last summer, and the disadvantage of a new location, shipping in the plants, etc., the stand of plants was very poor, and some varieties were lost entirely.

A few varieties highly recommended in other sections seemed to be a failure here but will be given one more trial before discarding. The stand of plants set this spring (1900) is as perfect, so far, as could be desired, and we expect a fine showing for another season.

I wish to say here, by way of interpolation, that in the opinion of this amanuensis, that the Ruby is the best all-round strawberry that Mr. Butterfield or any one else has in Southeast Missouri, notwithstanding the opinion of Mr. Butterfield to the contrary. It puts out fully twice as many runners as Bubach, is twice or three times more prolific, keeps in bearing about one week longer than that old favorite, is much larger and firmer, and the best and sweetest berry I and my family and visitors have ever tasted; and we have sampled all of Mr. Butterfield's 46 varieties. I will set out largely of this noble berry next year.

Grapes.—We have 16 varieties of grapes, including the most promising new sorts. All have made wonderful growth and promise a crop next year.

Gooseberries and currants set last spring have some fruit, but not enough to show preference.

The list of varieties of pears is a good one, and all have made a good growth, and we expect some valuable additions.

The orchard trees, including apple, peach, plum, cherry, apricot and quince, all made a good showing and promise to be one of the best orchards in the state. On each side of the driveway, on the south side, is a row of pear trees, Kieffer, Garber and Clarigeau, which were set last spring, and which have made a wonderful growth of two feet this spring, and several have pears on them.

A few rows of pear and cherry stock planted between the orchard

rows, were budded last summer, and have already made the wonderful growth of two and one-half to three and one-half feet. The stand is almost perfect and almost uniform. The blackberries and raspberries have made a good showing, and are quite full of fruit.

The 120,000 apple grafts planted in 1899, made only an ordinary growth last year on account of the dry, unfavorable weather; but this second day of June (1900), many of the trees are four to five feet high, and some are found that are even more than six feet high, and making an enormous growth. The growth of the apple trees are equal to any I ever saw.

Peaches and plums are almost a perfect stand, and from three to four feet high now. Cultivation has been ordered stopped to prevent too large a growth. The growth is simply greater than I ever saw anywhere else. It confirms my first opinion, often expressed, that the soil is particularly adapted to tree growth—possibly on account of the large quantity of iron in the soil. All of this spring's plantings of apple, peach, plum, pear, cherry, etc., are making a wonderful growth.

I would like to add one more thing to this report by saying that the nursery and experiment station at Farmington is an assured success. The people are well pleased with the venture, and many are preparing to plant commercial orchards at once; and scores of interested people visit the experiment grounds each week. Surely South-east Missouri will soon be to the front, just as she develops her wonderfully latent forces.

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#### Discussion on Handling Fruit.

J. M. Irvine.—Grocers avoid buying boxes that can not be tied together as e. g. those with sloping sides.

L. A. Goodman.—Apples for Paris were wrapped in two papers and put in cold storage March 12. We had 73 barrels and they came

out in fine condition for shipping.

A. Nelson.—Apples rightly picked and handled keep easily. I sent a barrel to Manila, which traveled 47 days without cold storage, but our soldiers there were glad to eat them. There is no end to the market for fancy apples.

The meeting adjourned until evening.

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#### FOURTH SESSION.—Wednesday, 8 p. m.

Music during the evening was furnished by young ladies at the piano and three violins.

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#### PROPAGATION FROM INDIVIDUAL TREES.

By D. A. Robnett, Columbia, Mo.

The subject assigned me is the most important of any that is now before our society. It is one that has been neglected for so long that it will take years to get back to where we can have healthy trees.

We have learned from older men of the state that our stock and scions are now obtained altogether different from the way they were when grafting scion onto roots was first practiced.

Forty years ago a nurseryman would not use seed to grow stock unless they got them from very fine apples that were grown on healthy, long-lived trees. Then the scion was also obtained from ideal trees, that had proven themselves true to name and regular, prolific bearers.

Now the practice is altogether different. Seeds are bought in  
H—5

France in large quantities without any knowledge of the kind of tree or fruit—just anything to get quantity at low price, anything that will grow a root.

The scion is now obtained wherever possible, often from old, worn out orchards where trees are half dead or from scion orchards which are made by leaving trees that are too common to sell in old nurseries. These are cut from year to year. Nature is interfered with, but the little scrub trees send up long new growth every year and try to form new tops, not fit for scions, but are often unscrupulously used.

Once upon going to a nursery for trees I found in it at least three thousand trees that the rabbits had ruined. All of them had the tops and the larger limbs cut off. I asked the owner why he had cut them back. He replied, "Oh, I was getting scions?" Now this is altogether wrong. But who is to blame—the man who wants to buy cheap trees or the nursery man?

We must propagate trees from individual trees. The stock as well as the scions must have ideal parentage, or the very best that can be secured.

In connection with the Missouri State Experiment Station we have, under the instruction of President N. F. Murray, commenced to grow a limited number of trees from fine individual trees. We go to the bearing orchard in the fall just before gathering the crop and label the trees from which we want to cut scions. Only trees of perfect form, health and well filled with fruit of fine color, size and shape, are labeled.

For our stock we ride the county over and find some of the oldest apple trees that have fine size, shape and a perfectly healthy tree—one that has proved itself able to withstand root rot and all other disease. From such trees we engage the fruit, get the seed and raise our roots.

In winter, during the Short Course in Horticulture at the State University, we take our scions and roots, and under the instructions of Mr. Murray, or whoever may teach the class in the future, we graft them. We hope to continue this work from year to year.

As soon as these trees come into bearing we will in the same way

take our scions from the best individual trees, always getting our stock from seed obtained from trees that have proven themselves hardy and prolific. Now many will say all are not so fortunate as you. This may be true, but any young man or woman can go to Columbia to the School of Horticulture and during the term qualify himself to carry on this work for himself, and he can also furnish his neighbors a few trees for family use.

No man can undertake this work and expect quick and great returns, for he will not get his pay until he gets it in the way of apples from long lived trees, apples of fine color and perfect shape.

If one will use the same good judgment in raising trees from good individual trees as the intelligent farmer does in raising stock from good individuals, he will soon have fine trees (without pedigrees).

Who would think of going to the corn field to get seed corn and pluck from the smallest stalks the nubbins, because he could not sell them? This is practically what has been done by nurserymen for ages. They cut scions from the old nursery stock that has been left because not fit for sale. I have 10,000 apple trees in my orchard and to-day I would value them at one dollar more per tree if I knew every scion came from a healthy tree, that had proven itself a fine bearer, and a root from a seed that was grown on a large, healthy old tree.

The propagation from individual trees is of vastly more importance to the fruit grower than the breeding of stock is to the farmer, because our mistake takes years to correct.

If the stock raiser goes out to buy an animal to put at the head of his herd of cattle he will select the finest individual, one from a family that has been proven to be a fine reproducer of good cattle. If he proves unsatisfactory in any way, no matter at what cost, he can be turned to beef and no great harm done. But not so with our trees. If they are poor stock or scion we do not realize our mistake until too late. There is no place or time to correct along the way. Time, money and trees must all be sacrificed to pay the debt of ignorance or imposition.



## Discussion.

Prof. Whitten.—I was glad when Mr. Robnett took scions from fine trees for testing by the side of indifferent ones. The rose and carnation growers in seeking to produce improved varieties do so by selection from ideal specimens, from single plants showing most strongly the desired characteristics. This ought to be done by fruit men also, by selecting scions and roots from the most productive and best trees.

J. J. Kiser.—This is a most important question. Your trees may be fine looking but if they are not productive it is because the scions came from poor trees.

Master Barton Robnett gave a bright recitation entitled "Ha'f Way Doin' Things Won't Do."

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APPLE TREES—A STUDY OF THE EFFECT OF REMOVAL OF PORTIONS OF THE BARK UPON APPLE TREES.

By N. O. Booth, Columbia, Mo.

During the last few years several articles have appeared in different agricultural journals advising the stripping of portions of the bark from old failing fruit trees to renew their vigor and promote fruitfulness. Quite fabulous accounts are given of the beneficial effects of such treatment upon certain trees and some of the reasoning applied to the problem is quite unique. Among those familiar with this practice there seems to be some difference of opinion as to the purpose of such treatment. Some of these parties claim that the idea is to renew the bark which having become dry, hard and non-elastic does not yield readily to the outward pressure of the growing tree and retards growth both by preventing new wood from being laid down and by interfering

with sap circulation. Trees in this condition they term hidebound. Others claim that the sole object is to induce greater fruitfulness, the process of stripping by retarding the downward flow of elaborated sap, promoting the formation of fruit buds. It is thus analogous to ringing, girdling, notching, etc. This practice of bark removal while it seems to be quite well known amongst our older fruit growers, is scarcely mentioned by our horticultural authorities.

Two years ago an experiment was started at this station to determine the effect of such treatment upon apple trees. Two trees were chosen for this purpose; a Rambo and a Ben Davis. They were both trees of good size, the Ben Davis about twenty years old and the Rambo probably a few years older. The Ben Davis was growing in plowed land and received regular cultivation. This tree was part of an old orchard and had been left undisturbed on account of its vigor and form when the rest of the orchard was grubbed out. It had commenced to decline however; branches were dying in the crown of the tree and large patches of dead bark were showing on some of the main limbs. The Rambo was standing in sod; the earth around it had been dug up two years previous to the beginning of this experiment and thirty pounds of raw bone meal applied. The first year after the application of the fertilizer the tree made a very rank growth and blighted quite badly. It has been free from blight since and the growth has been very good for a tree of that age and culture.

Both these trees were operated on June 19, 1898. Strips of bark two or three inches wide and extending up the trunk and a few feet on to the main limbs were removed. An interval of six or eight inches of undisturbed bark was left between stripped portions. The bark at this time of year peels rapidly leaving the soft smooth cambium exposed.

These stripped places were carefully watched to note the effect upon the cambium. On the Rambo tree with the exception of two short spaces upon the limbs, all of the exposed cambium kept on growing and commenced to form new bark. The stripping on the Ben Davis was not nearly so successful. About half of the exposed cambium lived. In two strips which had been made below dead limbs, which

had not been cut off the cambium died while in one made beneath where a large limb had been removed a year or two previous the cambium lived. Wherever the stripped portion extended to the dead wood already mentioned as being in the tree the exposed cambium never survived quite up to the old line of demarkation between live and dead wood.

The next year both trees were stripped as before, each strip being removed alongside of the strip of the previous season. There were no noteworthy differences between the results of this and those of the previous year's work. There was about a fourth of a crop of apples on each tree; about the same both for quality and quantity as for other trees the same year.

The Ben Davis tree was losing ground steadily. There were several dead branches and the dead portion in the trunk was extending. On this account and for the purpose of making a careful examination this tree was dug up in November of 1899 and the root, trunk and branches were thoroughly inspected. The heart wood of the trunk and many of the main branches was discolored and had a sour fetid odor. These discolored patches did not extend to the two outer annual rings, and there was no indication that the stripping operation in any way caused the trouble. The root was apparently sound and healthy. In every instance the wood laid down over stripped portion was less than on the undisturbed portion.

An orchard on the college farm also gave some good data on this subject. It was composed of apple trees of various ages and had been pastured to sheep during the summer of 1899. These sheep had stripped the bark from a number of the trees. The extent of the injury varying from a few inches to a complete girdle. On the younger and more vigorous trees almost without exception the exposed cambium kept on growing, even where the injury extended clear around the tree. The growth in every case was quicker and the healing more perfect where the trees were younger and the growth more vigorous. Here, however, as in the case of the Ben Davis, the growth under the stripped portion was less in every case than where it had not been stripped. All of these trees were apparently healthy and making a

good growth.

Both in point of season and variety the experiment was unfortunate for determining the effect of this practice on the size and quality of crop. The two trees experimented upon, Rambo and Ben Davis, are both free bearers; the Rambo usually bearing too much. In neither case is any artificial method of forcing fruiting necessary or advisable. The season of 1898 was a total apple failure here and 1899 was a partial failure. So the test as to the effect on the fruit yield has not been satisfactory. Its benefits in this respect are problematical, but it might be advisable to try it with persistently barren trees. The best method of procedure, however, in such a case would be to first find the cause of such barrenness. If it were a young tree making a luxuriant growth and had passed the age when it should commence to bear without fruiting, stripping might be beneficial. Old trees beginning to fail from lack of nutrition would not probably be benefited by such treatment, but on the other hand would quite likely be injured. Extra cultivation and fertilization are the remedies which suggest themselves for such cases.

If it is suspected that the hard, resistant bark in old trees is constricting the growth this pressure may be relieved by slitting the bark up and down the trunk at intervals with a sharp knife. We have no proof that such a hidebound condition ever exists.

Sorauer\* is the only horticultural authority I have been able to find who mentions bark stripping. He gives a good description of the method and the results which he states is used for forcing trees into fruiting. He further says the practice is dangerous. It had certainly better be used with discretion.

In the summer of 1899 tests were made to determine the best time to remove bark from trees. The trees used for this phase of the work were two Rambo's standing in sod. They had received no cultivation for years and while bearing freely though rather spasmodically, were not making much twig growth. They were good apparently healthy trees. Beginning on the twentieth of March strips of bark

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\*A treatise on the "Physiology of Plants," p. 161.

were removed approximately every ten days until the twentieth of July.

The results were rather contradictory. The bark did not peel readily until the first of May. In all strips removed before that date it was impossible to remove the bark exactly down to the cambium. If the knife penetrated below the cambium the exposed wood of course died while if some of the bark was left on the cambium such cambium continued to grow. The cambium exposed May 1st and 10th lived while that operated on May 20th and 30th died. Those on June 12th and 19th lived while those removed on June 30th, July 10th and 20th only a portion of the cambium survived, the amount surviving being greater in the earlier strippings. It must be remembered that these were old trees which had ceased to grow vigorously where as has been stated exposed cambium frequently dies without apparent cause. A careful examination of the meteorological record for the season showed no apparent connection between the weather conditions at the time when the strips were removed and the results. Lack of material prevented the duplication on trees of varying ages and conditions which would have added value to this work. The results are too contradictory to justify positive conclusions.

Strange to say the action of wind or sunlight upon exposed cambium does not seem to be detrimental. The new bark seems to form quite as readily when exposed to the sun as when not, and the action of a drying southwest wind seems to have no deterrent effect whatever. The slightest mechanical injury to the freshly bared tissue is however quite serious. The effect of a finger nail dent was visible the ensuing autumn showing as a raised welt. Deeper and more extensive injuries were proportionally serious. Slips of the knife in taking off the bark afforded very instructive evidence on this point. Where the point of the knife ran in the same direction as the grain of the wood the injury showed at the end of the season as a ridge of newly formed tissue but where this cut was across the grain the cambium usually died for a half inch or more both above and below. The figures from photographs well illustrate this point, the injury here being done by sheep. These facts are of importance as suggesting the best treatment for accidental

bark injuries, such as arise from whiffletrees, etc. The common method of treating such barked places is to rub dirt or mud into the wound under the mistaken impression that these substances by keeping out the air will facilitate healing; whereas the mechanical injury to the tender cambium usually destroys whatever chance it had of surviving.

Summary.

I. If strips of bark be removed from a vigorous growing apple tree in early summer the exposed cambium will not die but will form new bark and continue growing. The success of the operation depends almost wholly upon the vigor of the tree.

II. This is not a vitalizing but a devitalizing process and should be used if at all only to throw an over-luxuriant and persistently barren tree into fruiting.

III. The action of the sun and wind upon such exposed cambium does not seem to be injurious but any mechanical injury of the freshly bared soft tissue is serious.

IV. The extent of the injury coming from mechanical abrasions of the cambium is greater when the injury has a transverse trend than when longitudinal.

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Prof. Williams sang a series of pleasing songs.

## SOME BEAUTIFUL FLOWERS—WILD FLOWERS.

Original Poem, by Amy M. Bradsaw.

Do they out-vie the splendor of the rose,  
As from their dewy petals they unclothe  
The breath of nature's wild perfume  
In grace and loveliness of bloom?  
These country cousins of the city flower  
Are far more blessed, at least in dower  
Of color. And, though flaunting not their charms,  
Their mother nature takes them in her arms.  
And close unto her heart they're pressed,  
And who but says, she loves them best.

They are sung to sleep by the bobolinks  
And close their eyes as the sun gently sinks;  
They wake up from refreshing dreams  
Kissed by laughing little sunbeams.  
On hillside with the golden grain,  
Coquet they, till by reapers slain.  
In all the forests' nooks and bowers  
Are found these tender, dainty flowers,  
Of which the poets love to sing  
When comes their first sweet blossoming.

Dear little flowers, never to grow  
In the strength of human life, or know  
Its toils and cares, its trials and sin,  
To struggle for fame and fail or win.  
Thou'rt a mystical life strong to reach  
A deeper, holier love than humans teach.  
Dewy eyes that smile on mine,  
I see in them a lesson fine  
Of patience, till contentment brings  
A strong hope nursed neath sorrow's wings.

Oh, almost human little flowers,  
'Tis well thou knowest not the hours  
Of life are fleeting, until soon  
Thou'lt blight before thy song is done;  
And love will leave thee when no longer fair,

And pass to younger, fresher flowers and ne'er  
Return to thy dull life of blighted hope  
When faded, old and spent, the bloom is naught.  
Brave little flowers, live on in innocence  
And sip now the best of life's brief fragrance.

So live, though in an humble sphere  
Thy lot be cast, thy life will be so dear  
In influence sweet, till the burden  
Lessens from the heart sore laden.  
'Tis modest, lovely lives like thine  
Where gems of worth and goodness shine.  
'Tis nature that revives the heart  
And stirs in man that noble part  
Which is half himself and the chain  
Which links nature and man again.

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## HOME OR FARM CANNERIES.

By D. S. Helvern, Mammoth Springs, Ark.

My first attempt at canning up farm products was five years ago, when I raised a large crop of tomatoes to ship to northern markets. But unfortunately by the time I had disposed of one-half of my crop prices went down so low that I must stop shipping, and what to do with those nice large tomatoes I did not know, unless I could can them up.

So I ordered a lot of 3-pound cans of our hardware merchant and my wife and the girls went to work and put up 400 3-pound cans of tomatoes, sealed with sealing wax. I took them to one of our grocery stores and told the proprietor to sell them at 10 cents per can. They were not labeled, and of course were not very enticing at 10 cents each when nicely labeled cans were selling three for 25 cents. I told the grocer to sell them on their merits, or give some of them out to reliable persons to sample and report.

The result was, in a short time the grocer asked me for more



tomatoes, as what he had were all sold and inquiries made for more of the same kind. I told him they were all gone and could furnish no more this season. After this we put up a few each year, until last year a Mississippi man came to our town offering to sell a patent device for canning up all kinds of fruits and vegetables at a very reasonable price. I bought the right and applied it to my cooking vat. The patent simply consists of a boiler similar to an ordinary cook stove washboiler, made of heavy galvanized steel, with gas pipes located beneath and fastened to the bottom and connected to the boiler by short tubes and designed to extend within the stove or furnace and be subjected to the heat and fire which is passing around them. It enables the water to be rapidly heated and forced through the short tubes into the boiler. These tubes extend three-quarters of an inch inside of the boiler bottom; therefore the bottom is always covered with water and can not burn up. Also caps are located over the opening of the tubes, which will keep the water and steam from being forced over the top of the boiler and scald the operator. These caps can be taken off if the piping is required to be taken out. A perforated steel basket to hold the cans or jars is arranged to raise or lower to any desired depth in the boiler, provided with vertical bars, with wooden handles on each side for convenience in lifting in or out without exposing the operator to the steam; also a close cover, which prevents the steam from escaping.

This outfit, with complete and accurate instructions how to put up all kinds of fruit and vegetables and oysters, is up-to-date and will process eight to sixteen 3-pound cans at one cooking and only requires 12 to 15 minutes for each change; will put up from 400 to 600 2- or 3-pound cans daily. This kind of a cooker only costs \$10.

The cooker or vat which I have applied the patent to is 30x72 inches and 12 inches deep. The gas pipes are applied to the bottom same as in the small cook stove boiler. I can process 53 3-pound cans every 30 minutes or 108 cans every hour. Thus in 10 hours I can process 1,080 cans, or in 24 hours 2,592 cans. Not only this, but if needs be I can put in a double tier of cans and thus double my capacity, as the cans are only five inches high and the cooker is 12 inches deep.

This may sound "fishy" to one not acquainted with so small an

affair as I have here on my "Rock Spring Fruit Farm." But to any one doubting my assertions I will demonstrate every statement made in this paper who will visit my farm during the canning season. It is a small affair and only cost me about \$25 besides the building; including building, \$75.

I put my plant up last July and put up about 2,000 3-pound cans of tomatoes, pears and apples, which I sold in our home market—tomatoes and apples at 90 cents per dozen and \$1.50 per dozen for the pears, while the Thayer, Mo., factory tomatoes sold at 75 to 77 1-2 cents per dozen in our market. I have been complimented by every one who sampled my tomatoes—that they were the best they had ever eaten. The tomatoes were peeled and packed by my wife and four girls and the processing was done by my two sons and two sons-in-law—all by our own help and no big wages for hired help—and every can of tomatoes that I heard from were identical.

Can every body do the same as I did? I answer yes, you can if you are honest enough to put good fruit or vegetables into the cans. We always put the fruit into the can just as large as the hole in the can will allow, and the fruit or tomatoes will come out as whole as they were put in and look just like they were fresh from the field or orchard and taste as well as if fresh picked. To process 1,000 3-pound cans requires seven or eight peelers, one man to solder, one to scald, fire up and cook and 80 bushels of tomatoes or apples.

The object of this farm cannery is: when prices of green fruits or vegetables run down so low that they will not bear shipping have your cannery ready and go to canning up your surplus truck. All kinds of fruit or vegetables can be put up in this way and save a great loss to the farmer or grower. We are aiming to put up 12,000 to 15,000 3-pound cans this season on our little plant.

## CULTIVATION, PRUNING AND CARE OF PEACH ORCHARD.

By E. A. Sylvester, Osborne, Mo.

This subject has been assigned to me by our worthy secretary and I fell as if some one who has more experience might give us more light on this subject than I can.

In cultivation and care of peach orchard, we will take it for granted that medium sized one-year-old trees have been set on a high elevated piece of ground which has been properly prepared to receive them.

The first two years crops of beans or potatoes may be grown between the trees if the soil is rich enough to grow both crops, by being careful to cultivate shallow next to trees. After second year, trees should be kept clean and free from weeds by shallow cultivation to form a mulch of soil two inches deep. All culture each year should be stopped by first of July so as to give the wood a chance to mature before winter.

Pruning.—After trees are set they should be cut back twelve to eighteen inches above ground. Some of the best trees I ever had was where the branches came out from six to eight inches above ground. Low formed heads are thus produced. They will shade the roots and invariably be straight handsome trees to gather fruit from. The second spring and each year after, the twigs of previous years growth should be shortened one half, and any limbs that may want to cross each other should be removed.

The orchard should be kept free from weeds and the land in good order by manure if necessary. By cultivating shallow and often to July 1 our trees will make good growth early and mature the wood so as to stand the winter perfectly. Washing the bodies and limbs with lye made from wood ashes or whitewashing them twice each year will make smooth bark and will keep borers from working at the bodies. They seem to be the only enemies we have to contend with here.

FIFTH SESSION—Thursday, 9 A. M.

The prayer of the morning was offered by C. W. Murtfeldt of Kirkwood, Mo.

Business Meeting.

The question of help to the Free Traveling Library had been presented on the previous evening by Miss Perry, of St. Louis, chairman of the committee on that work, appointed by the Federation of Women's Clubs. The matter of decision was now taken up.

J. J. Kiser.—There could be nothing better done than to respectfully ask the Legislature to appropriate money for this purpose.

Prof. Whitten.—This is a laudable enterprise and appreciated by the districts lacking library opportunities. I move that the matter be referred to the executive committee to act as it deems proper.

The motion was seconded and carried.

A letter was read from G. B. Lamm stating his plan for gathering material for a school book of horticulture.

The Secretary recalled the action previously taken on this topic.

Prof. Whitten said the committee on Horticultural Education had found a year ago that the work for supplying such instruction was being well done and that it was not feasible to compile such a book as was contemplated. The joint report of this committee with a similar one from the Teachers' Association suggested ways for stimulating the interest and influence along this line.

Prof. Stinson.—I move that the whole matter be left with the executive committee. After the second the secretary read the report of the last meeting of the educational committee at which it was decided that such a work was too prodigious for one man.

L. A. Goodman then offered an amendment that the question be settled now by the society.

J. M. Irvine offered as a substitute that the society reaffirm its position taken last year that it is inadvisable to attempt such a work. This was carried unanimously.

The following resolution was also carried:

Resolved, That such a work would be more than any one man should undertake and it should contain so much information in all lines of work, practical growing and cultivation, insects, fungus diseases, botany, chemistry, geology, etc., that it seemed to the committee inadvisable to attempt the preparation of such a work at this time.

J. C. Evans offered a resolution recommending that Treasurer A. Nelson be appointed one of the commissioners to the Pan-American Exposition in Buffalo in 1901. This was unanimously adopted as follows:

Whereas, arrangements are being made to hold the Pan-American Exposition at Buffalo, N. Y., in 1901 and

Whereas, it has been the custom of this society, on all such occasions to be in the front rank with an exhibit of the horticultural products of the state, and

Whereas, in a short time a board of commissioners will be appointed by the Governor to take care of the interests of the state in that exposition and it is the wish of this society and to the interest of the state that a reasonable portion of that commission be composed of our best and most efficient workers; now therefore, be it

Resolved, by the Missouri State Horticultural Society in semi-annual session at Chillicothe this June 7, 1900, that his honor, Gov. Stephens be and is hereby most earnestly requested to appoint as commissioner of Horticulture to the Pan-American Exposition our honored co-worker and Treasurer, Mr. A. Nelson of Lebanon, Mo.

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#### Discussion on Transportation.

J. T. Snodgrass.—I should like to see some action taken by the society toward some legislation on behalf of the shippers for routing cars and controlling refrigeration.

A. Nelson.—I wish to thank my friends here for their hearty indorsement as possible commissioner to the Pan-American Exposition. Concerning the railroads, from the officials I receive fair treatment and

concessions in rates and find them liberal and public spirited.

J. T. Snodgrass.—A committee on transportation from the Southwest Fruit Growers visited the railway officials but could get no promises nor consideration of their propositions.

L. A. Goodman.—The railroads are responsible for shipping and routing—often the growers' choice of routing would not be so good. I would suggest a committee to confer with the different officials. They usually respect a business proposition from the growers.

J. C. Evans.—It is doubtful if the Legislature can control this question as the fruit goes outside of the state. The Interstate Commerce Commission may be the proper head of such jurisdiction.

D. McNallie.—The routing is done in this state but there are no laws for our recourse. Our last resort is an appeal for new laws.

The following resolution was adopted:

Resolved, by this society that we ask the members of our next General Assembly to thoroughly investigate all business operations of transportation companies in the interest of producers.

L. A. Goodman.—I move that a special committee be appointed to look into these transportation problems and report at the Winter Meeting. Motion carried and the members appointed on the committee were, J. C. Evans, D. McNallie, A. Nelson and J. T. Snodgrass.

The following telegram was received and read:

Buffalo, N. Y., June 7, 1900.

L. A. Goodman, Secretary Horticultural Society,  
Chillicothe, Mo.

Please present my compliments and best wishes to your society. I trust you may provide for a magnificent display at the Pan-American Exposition next year. The outlook is most promising.

F. W. Taylor.

Supt. Dept. of Horticulture.

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Chillicothe, June, 6, 1900.

The committee on flowers beg leave to submit the following report: Premiums are awarded to the following exhibitors:

Mr. Weatherby—Palms and Potted plants.....	\$3.25
W. O. Clark—Amaryllis and other plants .....	2.50
C. W. Murtfeldt—Roses .....	.75
S. B. Wilhite—Bouquet of roses.....	.25
J. J. Brodbeck—Collection of flowers.....	.50
J. Y. Powell—Collection of flowers.....	.50
Mrs. J. C. St. John—Bouquet of roses.....	.25
J. H. Brackey—Plants and cut flowers.....	1.00

Total.....\$9.00

The committee further earnestly recommends that all entries, in future, be plainly labeled, the committee having found great trouble in giving proper credits.

Eda A. Sutermeister,  
Emma J. Park,  
N. O. Booth, Chairman.

The committee have examined the fruit on the table and submit the following report on same:

#### Strawberries.

1st for Bubach, G. A. Smith, Chillicothe, Mo.....	\$ .50
2d for Bubach, G. P. Turner, Meadville, Mo.....	.25
1st for Gandy, S. B. Wilhite, Chillicothe, Mo.....	.50
1st for Warfield, J. T. Snodgrass, West Plains, Mo.....	.50
1st for Bismark, J. T. Snodgrass, West Plains, Mo.....	.50
1st for Brandywine, G. A. Smith, Chillicothe, Mo.....	.50
1st for Crescent, G. A. Smith, Chillicothe, Mo.....	.50
1st for Nick Ohmer, T. Wentzel, St. Louis, Mo.....	.50
1st for William Belt, Geo. W. Cramer, Chillicothe, Mo.....	.50
1st for Collection, H. R. Wayman, Princeton, Mo.....	5.00
2d for Collection, S. B. Wilhite, Chillicothe, Mo.....	3.00
3d for Collection, R. M. Megar, Chillicothe, Mo.....	.50

#### Cherries.

1st for Early Richmond, T. Wentzel, St. Louis.....	\$ .50
1st for Elton, T. Wentzel, St. Louis, Mo.....	.50
2 Varieties, J. V. Young, Chillicothe, Mo.....	.50

Apples.

1st for Collection, Conrad Hartzel, St. Joseph, Mo.....	\$2.00
2d for Collection, H. R. Wayman, Princeton, Mo.....	1.00

Gooseberries.

1st on Collection, J. F. Alford, Chillicothe, Mo.....	.50
2 Varieties, J. V. Young, Chillicothe, Mo.....	.50

Currants.

J. T. Panell.....	.50
1st on Collection, J. Y. Powell.....	.50
2 Varieties, J. V. Young, Chillicothe, Mo.....	.50

In behalf of the society we extend thanks to those having branches of the different varieties of Gooseberries, Blackberries, Raspberries, Currants, Plums, and other fruits.

D. McNallie,  
Frank Holsinger,  
T. R. Peyton.

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REPORT OF SECRETARY.

One of the great features of to-day's education seems to be, to know more of nature, her improvement, her development, her moods, her whims, and her secrets. This is not only true of all the wonders of nature in every line that you may choose to investigate but is particularly true when you come to examine into its tree and plant growth and the laws that govern it.

There never was a time when this tree growth secured the attention of all classes of our people so closely as at present. In all the cities, towns, and villages of our land you find this interest growing in the minds and hearts of our people. It interests not only the farmer and fruit grower but many of our best professional and business men be-



cause they see the need of this tree growth to make and keep our lands fruitful.

You will find oftentimes in our villages a physician, a lawyer, a merchant, or a mechanic who is a true lover of nature and secures the best growth to his plants or trees, and knows more of their nature than any of the farmers in his location.

We can not be successful and enjoy the tree or plant growth without a love for the tree or plant. A love for the orchard, seeing beauty and utility in its every leaf, twig, branch and tree, knowing what every part means to the tree, realizing that the tree is alive, that it needs to eat and drink and breathe, and that it grows because it utilizes the elements of air, soil, and water, the same as does the animal. The people of our cities and growing more and more into this love for the trees, and from this into the care for the birds our best protectors, until we shall see ere many years the careful guarding of every tree, plant, shrub, and birds in all our land.

We shall then no more have to guard our orchards with a shot gun to keep off the thieves. We shall then no more have to arrest the boys and men for indiscriminate slaughter of all the feathered tribe. We shall no more see the insects taking our choicest specimens. This love of trees, in our cities is one step in our direction and we hail with gladness this increased interest and knowledge of what trees and orchards mean to this land of ours.

#### The Birds and the Bird Law.

We should every one of us take up this fight for the birds and see if we can not only prevent the killing of them but also create a sentiment all over our state, in all our cities, towns and villages and in all the country in favor of the birds. It does seem that if people knew their value and their importance and their habits, they would not so ruthlessly destroy them. We must keep this matter continually before the people and show day and night to all kinds of assemblies the need of their preservation. A national or state bird law preventing the killing of any of our song birds, the bobolink, the meadow lark, and the quail would be worth untold millions to our producers. Every local

society should continually keep this matter before their people and thus help create a sentiment for their protection. Get the assistance of our newspapers in this matter also, and we would soon have more birds and less worms. An effort will be made before our next Legislature to get a prohibition bird law for at least four years.

Knowledge is free. Shall we accept it? Take all you can use, it is yours; but no more is yours than you appropriate.

'Tis heaven alone that is given away,  
'Tis only God may be had for the asking:  
No price is set on the lavish summer;  
June may be had by the poorest comer.

And what is so rare as a day in June?  
Then, if ever, come perfect days;  
Then heaven tries earth if it be in tune  
And over it softly her warm ear lays;  
Whether we look, or whether we listen,  
We hear life murmur, or see it glisten;  
Every clod feels a stir of might,  
An instinct within it that reaches and towers  
And, groping blindly above it for light,  
Climbs to a soul in grass and flowers.

—*Lowell.*

#### Condition of Fruits.

Not very much change from the reports I have sent out this summer.

The strawberry crop has been a fairly good one and prices have been well maintained. The raspberry can not be more than one-half and in many places one fourth of a crop. We may surely expect good prices.

Blackberries still promise an abundant crop.

Grapes are also well loaded and in good condition.

Cherries are ripening their fruit well and wherever the trees are in good condition they are holding a good crop of as perfect fruit as was ever seen. This is one of the wonders of nature how that one year we will find the cherries every one of them wormy and the next year every one sound.

The plum trees in many places will scarcely ripen a plum, they have been stung so badly.

The pear crop will be light indeed because of the late spring frost.

The peach crop on old trees will be a good one, where the trees are in good condition. Many of the younger trees and those trees, cut back severely will not hold much fruit and hence we shall not have over one half crop of peaches.

The apple crop still promises well and it is reasonable to expect a fair crop on most of our commercial varieties. There are exceptions to this rule of course, but they are caused by the cold storms or the condition of the trees, or by the canker worm. This canker worm pest, has caused us more trouble and loss this year than ever before in our history. Whole orchards have been stripped of every leaf and of course the fruit goes with this loss. Spraying is our only remedy.

Again I wish to call your attention to the peculiar root knot which I find in some of our nurseries and in many of our orchards. It behooves us well to watch the roots of every tree we plant and reject all that show the least inclination to knot. I show you a sample of the beginning of the trouble on the nursery trees, and what it becomes in a few years. It is sure death to the tree. I show you a sample of root aphid on a nursery tree sent me by a person wanting to know if it is worth planting. Surely no good nurseryman will send out such trees and no good planter will plant such trees.

The leaf roller has been causing a lot of trouble in many orchards and is still at its work. I have found no better way than hand picking.

For all these pests, for all this damage, for all this injury I know nothing better than good care and good cultivation. It surely admonishes us each year more and more that we must be more watchful, and more vigilant and more industrious; that we must study to know more of the secrets of nature, that we must be more careful of adaptability if we expect to reap the best results.

#### Selection for Specific Ends.

Individuality in our trees; vigor of growth; hardiness of tree to withstand winter cold and summer heat; adaptability to our soils and

locations; all these questions come to our mind as the most, the very most important questions that we can study and discuss and experiment with: and, I regret to say the ones we know the least about.

I wish to urge upon the attention of every fruit grower the importance of these matters to every one of us, and the absolute necessity of all to be observing and experimenting in this direction, for upon the solution of some of these problems rests our success in the future.

The selection of certain trees for propagation the same as we select our seed corn, the individuality of some of our trees you have all observed this fact, then why not use this knowledge. We are continually crying for more knowledge and yet do not use what knowledge that we have.

Vigor of growth, hardiness, adaptability; why not select and utilize these trees and scions and seed, with these features in view. Can we do anything better? Can we experiment more directly? Can results be more surely secured? Why not then use this common sense way in growing our orchards?

#### Spraying and Dusting.

More and more each year we find the value of a good spray pump and the importance of its use. We must fight the insects if we would succeed. The dusting machines are also coming into use more prominently. Each year we should know more and more of what to do when to do, and how to do it.

We have been testing the merits of the dust and spray and find some advantages in each. We can not always get the leaves moist enough to hold the dust, and we can not always get the ground firm enough after a rain to drive the wagon over. We can dust four times as fast as spray but it is not always as satisfactory. There is still much to learn, very much to learn in spraying. We have used lime alone largely and still believe that it is not only a fungicide but an insect preventive. We use it on our vegetables why not on our trees either in the dust form or the spray form. We have dusted the trees with Bordeaux mixture and sprayed with the same. We have used the combination of Paris Green and Bordeaux in both spray and dust.

Just what results will be we can not yet tell.

For the canker worm the spray is much the best and the surest. But still you can dust them and kill them also. Every fruit grower should try one plan or the other until we find some plan that is sure and safe and cheap.

#### Report From the Paris Exposition.

It was a fortunate thing for us that we made the extraordinary effort last year in securing fruit for Paris. Results are showing already. Our apples are attracting attention and we have a good report already from Mr. Dunlap and one first prize has been awarded us. Most of you know that it took a most persistent effort last fall to secure apples for display, and in March when we repacked and shipped over seventy-three barrels, two hundred and nineteen bushel of as fine apples as we ever had, we felt repaid for our effort for we felt sure of first place, as usual, in our exhibit.

We have enough fruit to put upon the tables, three or four barrels of apples each week of the six months exposition. We will have still more work to do in sending apples this fall to Paris for a more complete display. We can not have a better opportunity to advertise our apples and we must make the best use of it.

Following are the letters received from Pomologist Brackets and Senator Dunlap:

Paris Offices, May 21, 1900.

Mr. L. A. Goodman,  
Secretary Missouri State Horticultural Society,  
Westport, Missouri.

Dear Sir:—Your favor received. In reply will say that at the first competition of fruits, we received for our exhibit four first prizes, three second and three third, the state of Missouri coming in for one of the first prizes. Illinois and New York also drew first prizes, and the exhibit as a whole obtained a first prize. The second prizes went to Nebraska, Iowa and Connecticut. The third prizes went to Virginia, Kansas and North Carolina. I will endeavor to enclose diagram showing location of the various exhibits. Missouri fruits now occupy a table and a small pyramid adjoining the entrance to the hall and are in a very conspicuous position. We have had a photo-

graph taken of the Missouri display and will endeavor to send you one in time for the meeting. Our exhibit is not entirely installed, which accounts for the unfinished condition of a portion of the building. We were obliged, in order to have our fruits on exhibition at all for this competition, to cover the glass dome with burlap to reduce the temperature within reasonable limits. We expect, however, within a few days to have on the permanent cover. The fruit is keeping very well indeed and comes out in excellent condition. I think you may say to our horticultural friends of Missouri that we shall want some of their best fruit during the months of September and October, and hope that you will lay your plans to furnish the best you have in such quantities as we will write you hereafter. We expect to maintain this exhibit until the Fall fruits arrive and will hold back the best keeping varieties for that purpose to be exhibited during the summer months. We withdrew eight barrels of Missouri apples for this first exhibit and have ordered up from Havre for the competition of this week. It may be well for me to say that these competitions for award occur about every two or three weeks throughout the season so that by the end of the Exposition we hope to have a number of first prizes to the credit of Missouri fruits. While all varieties are showing up well, the York Imperials are keeping splendidly and attract a great deal of attention. Personally I am of the opinion that the York Imperial will be as great an apple for the Mississippi Valley as is the Ben Davis. The fruit dealers in Paris who have visited our display seem to be very much taken with the russets that are shown in some of the exhibits. This would indicate that we might get rid of this variety to our own advantage and please the Frenchmen at the same time. If undue restrictions are not placed upon the importation of apples into France, there is certainly an opening here for our best fruits. Apples have sold on the market as high as two francs (forty cents) each which are no better or larger than Huntsman Favorite. The ordinary apples, which are very ordinary indeed, sell for from fourteen to eighteen cents a pound. The dealers here in Paris are taking a great interest in our exhibit and are anxious to know where they can procure these fruits at the present time. We expect to publish a list of contributors to the exhibit from the different states and will distribute this list among all who are interested.

I have not received the receipted bills which I requested you to send. The United States Commission require these before they will issue vouchers for their payment. Referring to the item for barrels, will say I have that receipted bill which you sent me some time since and as we propose using these barrels for displaying our commercial packages which we are now preparing we will pay for the barrels. Trusting that the newspaper report of the heavy frosts in the

West have not done material damage to the fruit crop of this season and with best wishes for the success of the State Horticultural Society and fruit growers of Missouri, I remain,

Very truly yours,

Henry M. Dunlap,  
Expert in Horticulture.

U. S. Department of Horticulture, Division of Pomology.

Washington, D. C., May 29, 1900.

Mr. L. A. Goodman,

Secretary Missouri State Horticultural Society,  
Westport, Missouri.

Dear Sir:—I am pleased to inform you that through advices just received from Mr. W. A. Taylor, assistant pomologist, now in Paris, that the first international temporary competition in group VIII—Fruit—has been installed and passed upon by the jury with the following results:

#### First Prizes.

General Collection of U. S.,  
Illinois State Horticultural Society,  
Missouri Horticultural Society,  
New York State Commission.

#### Second Prize.

Connecticut Pomological Society,  
Indiana Horticultural Society,  
Nebraska State Horticultural Society.

#### Third Prize.

Kansas State Horticultural Society,  
North Carolina Department of Agriculture,  
Gabriel Hiester, Harrisburg, Pa.

As the international jury was composed of French and Russian members we are highly pleased with our treatment especially in view of the fact that the installation was incomplete and hastily made owing to the delay in the construction of the building.

Other temporary competitions are to follow at which we have reason to hope we shall fare even better than in the first.

With hearty congratulations, I remain,

Very truly,  
G. B. Brackett,  
Pomologist.

### The Summer School at Columbia

for teachers it seems to me is just now reaching just the people in the way we want to reach them. If we can get these teachers all interested enough to study and think about this nature study we are sure to get results. The teacher makes his own plan and system and secures "observation" of the pupil in tree growth and all nature about him. This is the first great step, and we now have hundreds of our best teachers preparing themselves for this line of work. This summer school is one of the plans and Prof. Whitten has outlined the correct plan of instruction in horticulture, and every teacher is enthused over it. A directing thought, a word of instruction, a hint of a plan, that leads to investigating, to study, to thought, to observation is worth more to the teacher and his school, than all the bundle of facts that can be crammed into the pupils' head. This is just the work Prof. Whitten is doing at this school.

### The Winter School for Fruit Growers

in the short course is one of the best means and plans to get the young people to pile up facts in horticulture and store them away for future use that can possibly be made use of by the young men or young women of our state. The person will get more direction and more real knowledge in fruit growing, nursery work, floriculture, landscaping, and insect life in the three months real study there, than they can secure in years of experience on the farm or in the orchard. I only speak again whereof I know when I say that it will pay well for any boy or girl to attend the short course at Columbia.

### Our State Report.

is again on its mission. The papers read, the discussions had, the instruction given, the experience of our fruit men, the statement of facts, the failures, and the success of our members, have all tended to make the State Report valuable to every fruit grower of our land, and a rule of procedure for those wishing to undertake the growing of fruits or the planting of a home yard.



We have tried to make every page of it valuable, or instructive or directive of thought and effort. The railroad maps and words of information have had a directing influence on people of other states and has caused many of them to turn their eyes toward Missouri and her advantages. What the report is you have had a hand in making and the good words of commendation from all sides are yours to appropriate.

Pierce City, Mo., April 11, 1900.

Secretary L. A. Goodman,  
Westport, Mo.

Mr. Goodman:—The reports came to hand all O. K. Accept thanks for same. We could use a dozen more if you can spare them. It seems that you are doing your part for the state in horticulture and your report should be convincing evidence. I hope you may continue in the good work.

Our people are pushing everything in this line nicely. The interest has not abated any since you were here. More acres are being planted each year to fruits of all kind. Our people are looking for good things and improved varieties, making careful tests, discarding the failures and keeping the better ones. With best wishes, I am,

Yours truly,

J. K. Saunders.

Bentonville, Ark., April 9, 1900.

Hon L. A. Goodman,  
Westport, Mo.

Dear Sir:—I am in receipt of the 42d Annual Report of the Missouri State Horticultural Society—20 copies—which were distributed the 7th at our regular meeting.

These reports constitute a horticultural gospel in Benton county, Ark. The Benton County Society wishes to thank you personally for the favor.

I am very truly yours,

I. B. Lawton,

Secretary.

Winchester, Va., May 31, 1900.

Mr. L. A. Goodman,  
Westport, Mo.

Dear Sir:—I am in receipt of your report for 1899 and I consider it the best I ever saw.

Permit me to acknowledge my very great obligation. I am also in receipt of your card asking for spare copies of your report for 1887

and regret I have none to send you.

You also state that you have a number of state reports on hand for different years for distribution and as our people are new in the fruit business all literature is a great help.

Anything you have in that line will be greatly appreciated, especially the reports for 1899 one copy of which I have.

Will you kindly recommend to us three or four of the best journals you know devoted in whole or in part to horticultural interests.

We estimate our peach crop this season at seventy-five to one hundred thousand bushels—a full crop. Apples about half that amount which is about one-third of a crop.

Please advise us of the outlook in your territory.

Hoping to hear from you at your earliest convenience I am,

Very truly yours,

S. L. Lupton,

Secretary.

The condition of the orchards is much better than expected; this condition is due to the favorable winter and spring. The rains have not been too abundant, the weather has been neither too hot nor too cold, but all the spring the rains and sunshine and cool growing weather have been just about right to give the best of leaf growth and the best development of the fruit buds and the young apples. To-day then we find most of our orchards in splendid condition and prospects good for future use.

The canker worm has given an endless amount of trouble in many localities and it is only by spraying well that many have been able to save their trees. These trees where defoliated will of course suffer badly and not only will the fruit be lost this year but also there is danger of it next year. This condition however is not general by any means we are glad to say.

The Buffalo Exposition will have its turn in 1901 and our society will have to take its place with all the western states. There has not been a large exhibition anywhere in the country during the last twenty or twenty-one years but that this society has had a hand in showing Missouri fruits, and also in taking some of the first premiums at every important exhibition held in this country and we can not refuse to again take hold of the matter. A car load of fruits should be taken to Buffalo and there kept for use during the whole of the exhibit.

F. W. Taylor who had charge of the horticultural building at Omaha will again take hold of the work at Buffalo and he is our friend. Our Treasurer, A. Nelson is interested with a land company who are directors and promoters of this exhibit and they will through him give us many advantages and much help if we will take hold of it. We must do it.

The Louisiana Purchase Exposition at St. Louis will be another World's Fair that we will expect to take a prominent part in with our fruits. Here will be a good opportunity, the best probably we have ever had to show what fruits we have and our wonderful possibilities. Work ahead then, we can see; still room for something to do.

The state looks to us to make these displays and will hold us to blame if we do not capture some of the first prizes but when these awards are taken of course the state gets the honor.

And now dear friends and members we again meet to discuss these matters and see what we may learn from one another. We are glad that we do not know it all, we are glad that we have none in our state who claims to know it all, but we are happy to meet with all the enthusiastic fruit growers of the state and find them all willing to learn and willing to give of their knowledge to all who wish to know.

This knowledge is in the land somewhere, abounding in nature some place, and we know that we can secure it sometime if we do not grow weary and faint not.

While men are securing knowledge so abundantly in all departments of science, in all avenues of life, we are glad that we too can have some part in the improvement of our own department and help to establish a science of horticulture which means only "To see things correctly and then draw conclusions from what we see."

L. A. Goodman,  
Secretary.

REPORT OF A. NELSON, TREASURER, JUNE 5-7, 1900.

Receipts.

Jan. 1, 1900, Balance on hand.....	\$ 508.31	
Membership taken by L. A. Goodman..	8.00	
Membership taken by A. Nelson.....	23.00	
Jan. 31, Draft on State Treasurer.....	635.51	
March 26, Draft on State Treasurer.....	648.55	
		<hr/>
		\$1,823.37

Disbursements.

Jan. 31, P. O. Bill.....	\$ 30.38	
Express \$1.75, \$1.10, \$1.05 .....	3.90	
Expenses on Report.....	40.55	
Scotford Printing Co., P. O. Cards....	7.00	
Salary of Secy. Jan., \$66.66, Type-		
writer, \$20.00 .....	86.66	
		<hr/>
Warrant No. 448.....		\$ 168.49
Jan. 31, Hudson-Kimberly Pub. Co.,		
4 half-tones for Report.....	22.50	
Printing 4,000 impressions.....	22.00	
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Warrant No. 449.....		\$ 44.50
Feb, 28, Express \$2.25, .30.....	\$ 2.55	
Forestry membership .....	2.00	
Scotford Printing Co., P. O. Cards....	6.25	
P. O. Bill.....	17.09	
Salary of Secy. Feb., \$66.66, Typewriter		
\$20.00 .....	86.66	
		<hr/>
Warrant No. 450.....		\$ 114.55

March 26, Scotford Printing Co., Labels.....	\$ 7.50	
Express, .80, \$3.58, .50, \$1.50, \$1.06....	7.44	
Wrapping paper for apples.....	1.60	
W. G. Gano, repacking apples for Paris.	7.00	
Armour Packing Co.....	15.52	
Hauber Bros., 73 bbls.....	26.28	
	<hr/>	
Warrant No. 451.....		\$ 65.34
March 26, Dray on Reports.....	\$ 3.00	
Freight on Reports.....	11.34	
A. T. Nelson's trip to Eldon.....	13.50	
Salary of Secy, March, \$66.66, Typewriter		
\$20.00 .....	86.66	
	<hr/>	
Warrant No. 452.....		\$ 114.50
April 2, N. F. Murray's trip to Southeast Missouri		
Horticultural meetings .....	\$ 17.75	
April 2, N. F. Murray's trip to Eldon, Missouri		
Horticultural meetings .....	10.00	
	<hr/>	
Warrant No. 453.....		\$ 27.75
April 16, E. W. Stephens, Printing Report.....	\$ 113.98	
Express .....	4.30	
2 M. Pamphlets .....	40.00	
1 M. Reports bound.....	150.00	
Shipping and boxing.....	15.00	
Labels and freight.....	3.90	
	<hr/>	
Warrant No. 454.....		\$ 327.18
April 30, Freight on Reports \$13.77, Dray \$2.00..	\$ 15.77	
P. O. Bill .....	65.51	
Salary of Secy. April, \$66.66, Typewriter		
\$20.00 .....	86.66	
Scotford Printing Co., P. O. Cards....	4.25	
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Warrant No. 455.....		\$ 172.44

May 25, P. O. Bill.....	\$ 54.02
Building cases for State Reports.....	22.95
Salary of Secy., May, \$66.66, Typewriter \$20.00 .....	86.66
Scotford Printing Co., 1 M. Envelopes, Reports .....	12.00
2 M. Programs.....	12.50
1 M. Want Slips.....	1.50
Pencils, rubber bands.....	1.10
Express, .35, .35, .35, .75, \$2.05, Dray \$1	4.85
Warrant No. 456.....	\$ 195.58
Total Disbursements .....	\$1,230.33
Total Receipts .....	\$1,823.37
Balance on hand.....	\$ 593.04

Lebanon, Mo., June 2, 1900.

Mr. A. Nelson,  
Treasurer Missouri Horticultural Society,  
Lebanon, Mo.

Dear Sir:—This is to certify that you have to your credit on our books, five hundred and ninety-three dollars and four cents. (\$593.04).

Yours truly,  
W. I. Diffenderffer, Cashier.

Since the meeting the following warrants have been paid to close up accounts for the six months. Leaving a balance in treasury as follows:

June 25, Express, .60, .35, 100 Chillicothe papers \$2.00 .....	\$ 2.95
Salary of Secy. June, \$66.66, Typewriter \$20.00 .....	86.66
Warrant No. 457.....	\$ 89.61
June 30, Premiums at Chillicothe fruits.....	\$ 19.75
Premiums at Chillicothe, flowers.....	9.00
Expenses at Chillicothe, N. F. Murray..	23.50
Expenses at Chillicothe, D. A. Robnett.	17.00
Warrant No. 458.....	\$ 69.25

June 30, Expenses, Samuel Miller at Chillicothe...	\$ 20.00
Expenses, J. C. Evans at Chillicothe...	10.00
Expenses, L. A. Goodman and typewriter at Chillicothe .....	22.50
Expenses, A. Nelson at Chillicothe....	45.00
P. O. bill, telegrams, paper, pencils....	6.90
	<hr/>
Warrant No. 459 .....	\$ 104.40
	<hr/>
	\$ 263.26
Balance in treasury June 30, 1900.....	\$ 329.78

Your committee on Finance have carefully gone over the accounts of the treasurer and find them correct as reported.

J. C. Evans,  
J. C. Whitten,  
H. S. Wayman, Committee.

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### THE APPLE IN THE NURSERY.

J. E. Thompson, Windsor, Mo.

Ladies and Gentlemen of the Missouri State Horticultural Society:—

This subject of the apple its growth and training in the nursery is a very important one to the planter. One that has been too much neglected in past years and until within the last few years so far as my personal knowledge goes, was not very much agitated. But to-day this subject has been too highly agitated and this inflated value placed upon the whole-root system has cost the planters of this country many thousands of dollars. But the extra price that has been paid for this song of the whole-root tree peddlers has not been without some benefit to the planters, as it has awakened the wholesale growers to the realization that the roots are a factor in the tree deal, as it was not before the whole-root tree peddler began his agitation. Along this line there has been a material advancement, in the last few years. But this is a small digression from my subject and will say that I take it as a means

of shedding the light on what I shall say on this subject more clearly.

The apple, is either budded or grafted. Grafted on piece roots or whole roots. I will not enter into the discussion of the merits and demerits of the different methods of propagation as I regard one as good as the other, the only advantage in the matter is the cheapness of production to the grower. The cost to the planter to be equitable to him must be the same. I have not been able to see any difference in the orchard growth.

Growth.—There must be a healthy graft, to begin with. It must be planted in the last days of March or first days of April to get best results. Late planting will not allow of the full development of the young scion and the earlier the planting the better the growth. Prepare the ground in the best possible manner, pulverize it and pack it till the moisture will be held for future food for the plant. This is an important item in the success of the enterprise.

Soil.—The soil must be reasonably rich. It should be well fertilized either with clover, growth previous years or in any way that will make it rich, porous, loose and at the same time not have any trash or litter, on the plant. I regard the location one of the prime features in the matter. The tree must produce a fine lot of fibrous roots and this can not be done unless the soil will be in condition to make them. This can not be done in a tight soil. Neither can it be done in a wet soil. A loose loam is an important factor.

Cultivation.—This should begin as soon as the graft begins to grow. It should be done with a surface stirring tool. Should be done in a most thorough manner, not over three or four inches deep at first. The season will largely govern the after cultivation. Also the tools to be used. If dry then surface cultivation should be kept up till middle of August or first of September. If wet and the grass and weeds get a start then a more vigorous method should be employed. A one horse diamond plow run with the bar next to the rows, same to be followed by a hoe in the hands of a careful man, to clip out the weeds and grass is a most excellent way.

An Ideal Nursery Tree.—One that is two years old and has never



been stunted in its growth. Nice smooth body; well branched top; a full set of both branch and fibrous roots. If the above directions are carefully carried out there will be roots a plenty whether the graft is whole-root, piece-root, crown-graft or budded. It is the nursery man who makes the roots as well as the branches, in the nursery. And it is a lamentable fact that the demand for cheap trees has forced the planters of nursery stock, to push the production of the number of trees to the hurt of the quality of the trees. Better pay ten prices for a good tree properly grown in nursery, than plant a poor one—gratis. I wish to emphasize this point. It is worth your while to listen.

Pruning.—This should be done altogether with the hands—"glove pruned." Never allow the suckers to grow long enough to harden, so a knife is necessary to remove it. The bodies should be started out not less than twenty inches nor more than twenty-four inches from the ground. This is a safe medium and will be satisfactory to most planters.

Age to Market.—I prefer a two-year tree to plant, as it more nearly strikes the medium between the little tree that the rabbit can bite off, or the weeds grow around and smother, and the older tree that can be planted, so as to have apples quick. I find that a two year tree will stand all the hardship of a yearling, and grow off next season when a younger or older tree will not perform this function, so well.

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#### Discussion of Whole-Root and Piece-Root.

J. J. Kiser.—The weak point of the whole-root is in being grafted on a seedling.

A. Nelson.—Trees grow finely on two inches of root.

J. C. Evans.—I move that the question of whole and piece-root be added to the list of three already ruled out of order in this society.

The motion was voted down and discussion continued.

G. A. Smith.—Piece-root gives a larger, better tree. The middle piece is the best; the crown-root produces sprouts.

Evans.—Nurseries call the same grafts by both names.

Murray.—The trouble came when grafting was done on imported hard crab seedlings. We should collect seeds from the best trees in our own part of the country. The part made from the seedling will die first of root rot, the last to go will be the native scion part. In propagating we ought to select and save seeds and scions from the healthiest trees.

Beagle.—I have two whole-root trees which I can not tell from piece-root.

Culver.—I have 4,000 Stark trees all bearing healthy trees, true to name.

T. R. Peyton.—The so-called whole-root are grafted on four inches, the piece-root on two inches of root. The same trees in a nursery if grown shallow in the hot sun will be called whole if in shade and planted deep will become piece-root. Whole-root trees exist only on paper.

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## CARE OF ORCHARDS.

By A. T. Nelson, Lebanon, Mo.,

The subject assigned to me, "Cultivation and Care of Orchards," covers a great deal of ground, and to the planters of orchards it is one of great importance.

In the matter of cultivation of and the crops to grow in orchards, it is as with other work done in successful orchard growing, each man must take his brains to his orchard and there use them according to attending circumstances, soil, fertility, and other conditions. What would be advisable and correct on our red soil lands of the Ozarks would not be right or profitable in other localities. Here is a point that should be given careful attention: What is good, sound orchard sense for lands like President Murray has or Vice-President Robnett and

others may not be good sense when applied to lands in our section of the state. Still there is a line of general work that should be governed by principles that apply to all sections, whether on the Ozarks, on the prairie lands or on the Loess formations. Of course what I shall say applies to our locality, and is the conclusion reached through the work that has been done on the 240 acres of orchard I have helped to plant and care for under the instructions of my father, who has made many mistakes as well as some grand successes.

I find vast differences in orchards of same age and same cultivation and that is proof that one must take his brains to the orchard and do his work according to his surroundings. The finest orchard that I ever went through or examined is a small one of 1,600 trees, now 12 years planted, and is bearing this season its first full crop, and to-day we hope to take from this orchard two to four barrels of apples per tree. This orchard has been thoroughly cultivated, up to four years ago. Since then we have let it go as the trees were getting too large. We ran the mowing machine in it each year, cutting down all grasses and weeds and letting these lie and decay. This is the orchard we call the experimental one, planted, as one would say on the top of the ground without digging the holes to put the trees in. This orchard and soil present conditions that are, no doubt, exceptions to the general rule. The soil differs from much of that of the Ozarks, as this is a mulatto or chocolate soil, 10 to 12 inches in depth, with a solid marl subsoil. This marl contains plenty of plant food when loosened up by sub-soiling or otherwise.

The crops generally cultivated in this orchard up to eight years of age have been corn, only the ears being removed from the land, the stalks being broken down and plowed under, thus furnishing plenty of humus to the soil to keep it light and porous. With this manner of cultivation we have found we could produce a wonderful tree growth each year. The trees are planted 24 feet apart and the limbs will interlock when brought down with their crop of fruit this year. This will give you an idea as to the size and growth of the trees under our mode of treatment. The trees on May 28, 1900, showed a growth of from 5 to 12 inches of new wood. We will have to change after

this year and even this year we have commenced, as we are plowing all our orchards and not planting them. We will, however, on what we do not plant to corn, either put in cow peas or later on will cross plow and sow to rye and turn under in the spring following, to serve as a fertilizer. This is on old ground, old before the orchard was ever planted on it. I find that on our fresh ground we have so far, little use for extra fertilizer, as we produce strong, healthy wood growth by thorough cultivation.

When trees are first planted we generally put in five rows of corn between the apple trees and second and third years we drop off a row each year and after that we plant only three rows. This gives us ample room for cultivating between corn and trees and gives partial return for caring for the orchard. As a rule the orchard trees in our locality are planted 24 feet apart and some two or three of our large orchards are planted even closer; but experience has shown us that in the long run, with land as cheap as it is with us, one had better plant farther than 24 feet rather than closer. And while this is not on the subject assigned me I will say that I will plant my little 40 acres of orchard 33 feet apart for apples and use peaches for a filler, as my ground is now cleared, plowed and planted to corn for the first time, so far as we have any knowledge of, I know many disapprove of this plan, but we learn by experience if it does not cost too much to make the experiment.

In closing, let me again say every one planting orchards must, to a certain extent, be guided by surroundings, as to climate, soil, conditions, etc. Then I firmly believe less mistakes will be made in the future in planting and care of orchards than in the years that are past; and the young men of to-day who are getting on the horticultural harness, if they do not profit by the lessons presented to them by the active working men of our society, it will be the young men's fault and not the fault of the gray-haired men who have worked for years to build up this, the greatest single industry of any in the state. It should be the aim of the younger members of the society to so prepare themselves to be ready at any and all times to take up the grand work when those I refer to are obliged to lay it down. They have

donated many years of their lives to make fruit growing a grand success in Missouri.

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### Discussion.

G. A. Smith.—Trees planted twenty-seven feet apart in the orchard bring fine results; best on old cultivated land, good also on white oak virgin soil, but largest on river bottom. We use corn between the rows.

N. F. Murray.—Every one has to be judge of the land, soil and climate for his own orchards. Over the state I have observed orchards on hard-pan are in a deplorable condition. Good results may be obtained from planting on top of the ground, because on this hard, flat land under-drainage is needed, but it is best to select rolling land. Cover crops are needed to keep the earth from cracking open near the trees and damaging the roots. Air space should be left between the trees and it is not well to plant corn in too close.

T. B. Chandler.—In a farm orchard we ought to plant raspberries, blackberries, currants and gooseberries, for the cultivation of these puts the trees in fine condition and the bushes keep the wind from blowing away the leaves which serve as a mulch.

J. T. Jackson.—One excellent plan is to cultivate with disk harrow; cleanse thoroughly and sow in turnips in July. For me this never fails to give a fine crop. I disk four inches deep, both ways, averaging about once a month during the summer and so remove old weeds and avoid fire danger. A man can thus do one hundred acres a day. Fertilizing with clover chaff a foot deep is good.

J. C. Evans.—We need a cheap and easy way in commercial orchards, since we can not use a plow nor fertilizers except ashes when specially needed. I shall always use cow peas. The spading disk harrow is the tool adapted for preparing the ground. Sow the peas broadcast or in drills for seed. Put in in the middle of June and keep

the sun from burning the tree roots. The economy is one-fourth by drilling if peas are dear. A machine is needed to cut and thresh cow peas. The land must be fed for crops and it needs a fertilizer. The peas serve as such, they will fatten hogs and maintain and improve the land.

J. J. Kiser.—Strawberries on land once in cow peas grow twice as large as on corn land.

T. B. Chandler.—Nothing is of more fertilizing and feeding value than cow peas and they grow when clover fails.

C. W. Wilmeroth, of Chicago.—Commission men nor growers ever lose a dollar on fine apples, but we do not get five barrels of fancy out of a hundred. The Ben Davis oversold the best New York Baldwin. Where there is a fine orchard there is always a buyer. Poor apples can not sell to any advantage, for the freight, cold storage and handling is as much on a one dollar as on a four dollar grade. The barrel we think is best, better than the box.

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## HOW CAN WE GROW BETTER FRUIT?

By S. H. Linton, Marceline, Mo.

This question enters the deepest and innermost desires of every progressive fruit grower in Missouri. Progressive fruit growing? Yes, in quality and quantity is the broad lesson before fruit growers of this age. In our boyhood days, of fifty years ago, a man would have been called crazy if he should have planted one thousand apple, peach or pear trees or as much as one-fourth acre of small fruit with the expectation of a commercial business, but to-day there are thousands of acres, and thousands of people in this great state of Missouri that are devoted to fruit growing, the income from which aggregates into the millions of dollars annually. Then it is true that fruit growing has been progressive in the past years and is still, and will continue to pro-

gress as long as fruit seed will grow. Better fruit, implies comparative of good, more good, to make better. Charles Downing, with his far-reaching knowledge of horticulture said that "Strawberries will yet be grown as large as apples." This would be done in a general way. Now to the feasible, practical part of our subject:

"How can we grow *better* fruit?" First, select a location adapted to fruit growing. This location is found all over Missouri. Select varieties that have been tried and found to be adapted and productive in the immediate vicinity. With care and intelligence familiarize yourself with the soil formation of the entire plat intended to be planted to fruit. Select apple, pear and cherry trees not over two years old, peach and plum trees not over one year old, all of reasonable size, not over or under growth, healthy, vigorous and well developed in head, stalk and root. Never take any trees or plants that have been propagated in new ground or a sandy loamy soil and transplant them in old worn clay ground. After having taken a chemical analysis of the soil, calculate and plat off correctly the different soils for the different varieties of fruit that the soil is best calculated to grow. Prepare the soil according to the standard rules, supplying the soil with the necessary parts of plant food before the planting begins. From the time of planting until apple, pear, peach, cherry and plum trees come into bearing, the soil should contain nitrogen three per cent, available phosphoric acid six per cent, potash seven per cent. After apple and pear trees come into bearing the soil conditions must be changed in the plant food ratio as follows: Nitrogen two per cent, available phosphoric acid eight per cent, potash twelve per cent.

Bearing cherry and plum trees should have nitrogen two per cent, available phosphoric acid seven per cent, potash nine per cent. Bearing peach trees should have a soil containing nitrogen two per cent, available phosphoric acid five per cent, potash seven per cent. The plant food ratio and the food supply are important factors in fruit production. If the orchard plat is level, with but little, if any, drainage, the plowing should be done with a backland for each row of trees, with bed furrow between the rows having a drainage from the ends of the bed furrows that will give perfect drainage to the surface the year

through. Plowing afterwards should be done so as to leave the surface without changing these impressions. A location rolling or hilly should have level cultivation. Pruning should be done with care and judgment. The head of the tree should be formed during the first five years after planting. Taking out the water sprouts afterwards is all the pruning required. The nodes or fruit spurs should not be cut out of an apple tree young or old. The pear, cherry and American plum should have no cutting except dead or broken limbs. The peach should have the last year's growth cut back to one-third or one-half during the month of March. Strive to keep all trees vigorously growing. Plant according to the ability and means to give thorough care and attention in all the details, summer and winter. There is no effect without a cause in fruit growing, and every effect has a remedy and can be brought under control if the true cause is known and the proper means applied. Some diseases and insect pests are sometimes the result of negligence of the grower rather than other causes.

Experiments conducted, from time to time, on scientific principles are proof conclusive that fruit can be produced so perfect that the entire product of a tree or bush are duplicates. If this is true with thorough management of one tree or bush, why not apply thoroughness to all fruits with the same results? There is a disposition manifested at this time, with fruit growers' associations to secure better prices for the low grades of fruit instead of stimulating the growers to produce a better class of fruit. Over-production of first-class fruit will never be known. But it is an easy matter to plant more trees than the ability and means of the grower can properly care for. The fundamental principles of horticulture are based on the thoroughness of the profession being deeply seated in the nature of the horticulturist. It is not the acres or large number of trees that constitutes the ideal commercial orchard, neither is it the thousands of dollars behind the planter of large orchard that warrants the best fruit and the best results. The successful horticulturist is a student in nature study from early childhood through life, coupled with a thorough practice that every leaf, twig and root of the tree or plant are lesson-pages in the great text-book of practice and experience. The variance of the soil, climatic



conditions and changes, the plant food ratio and supply are all lessons of indispensable information to the fruit grower. Three-fourths to four-fifths of the more than sixty-nine thousand square miles in this great state of Missouri is adapted to growing as fine fruit as can be grown under the sun. This is why such men as Hon. N. F. Murray, Col. J. C. Evans, Hon. L. A. Goodman, Prof. J. C. Whitten, Judge Samuel Miller, A. Nelson, and hundreds of other progressive men of this state are engaged in horticulture and through their reflection and by the untiring, zealous efforts of these people we are indebted for these grand instructive, social and interesting horticultural meetings. Long may they continue in the good work.

Session adjourned.

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#### SIXTH SESSION.—Thursday, 2 p. m.

The prospects for an apple crop were reported by counties and showed an average over the state of two-thirds of a crop but not more in view, and this from Ben Davis, Jonathan and Winesap. Fair prices are expected as the quality is better than usual.

Baring, April 3, 1900.

Mr. L. A. Goodman:

Dear Sir: I thank you ever so much for the 42d annual report of the State Horticultural Society. As it has never been my fortune to be present at one of your meetings, I am happy to get the substance of the discussions of the meetings, which is a great solace and satisfaction to me. I am glad and proud that our state is so fortunate to be possessed of such a body of very able horticulturalists, who keep the ball rolling, who are ever ready to give advice and the benefit of long experience, to all who desire to learn and profit by their teachings. The people of Missouri owe a debt of gratitude to them, which I hope every reasonable man, will not forget to bestow. There seems to be a fair prospect now for a full crop of apples, also of pears, and about seventy per cent of peach buds are alive and nearly in bloom. Cherries and

plums are also promising. Strawberries that were cared for last season are promising, but small fruits are not grown for market here, and but few farmers planting for their own use. I have a few Japanese plums, viz., Burbank and Wickson, now in bloom. I am anxious to have them bear. Wickson seem more hardy in tree than Burbank. I am often pained to see deliveries of nursery stock here at Baring, mostly from distant nurseries, from different states, when we have a nursery in Edina, six miles from here, and other nurseries not far off, which are reliable; to see people, patronizing every slick tongued (so-called agent) with a glowing plate book, of some impossible and overdrawn sorts, to find out in time that their money and labor were in vain, as much of this dearly paid-for stock turns out to be very common-place and not suitable to our soil and climate. Then again, many who buy trees, even of good varieties, fail to prepare the ground and set them out in a proper manner, or to take proper care of them afterward. I will mention an instance of a gentleman of my acquaintance who lives not far from Edina, who set out a commercial orchard of good size. Said location is an excellent one, but the land had been in meadow and pasture for a number of years. This orchard was set out two years ago. I have not seen it, but was told by some of his neighbors, that the only preparation it got before setting out, was about four furrows lapped together, for each tree row. A friend of mine who passed along in the summer, told me that the trees seemed to stand in a good crop of meadow grass. Why will men of no experience make such ventures, as cost of trees and labor of setting out is quite an item, and he never can expect any benefit from such a venture. There is a neighbor family of mine, who bought some apple trees of me, two years ago, of which I happened to have a small surplus, and they took good care of them until last winter, when Mr. Rabbit pealed them complete. Others of my acquaintances, buy trees nearly every spring, for replanting, who never take time to watch borers, and so, tree after tree will perish from lack of care. Such carelessness is all right for the nurseryman, but not for the planter. The extreme cold snap of February, 1899. I am glad to report, has not resulted in much damage to our fruit trees, except to either badly neglected or very old trees, which will result in more being planted, and I hope that better care will be taken of orchards hereafter. Our young men who set out trees seem to be very anxious to set out proper varieties, and also to take care of them. They often ask me for advice, which I am pleased to give as far as able. Our hope for successful orcharding is in our younger generations. We stand badly in need of a county horticultural society.

My pear trees suffered considerably from blight and the February freeze, last year, but I cut out blighted limbs and they have now a

good prospect of fruit. My peach trees which I headed back have made a good growth and have buds enough for a crop.

Yours very truly,  
PETER DAILING.

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Holt, Clay County, Mo., July 2, 1900.

L. A. Goodman, Westport, Mo.:

Dear Sir:—I am just back from a three days trip in Platte and Buchanan counties, and the prospect for apples is very poor—in fact I saw no good apples. The crop was destroyed by canker worms. They are shipping some apples from Wallace, mostly Wealthy, one dollar to \$1.20 per barrel. I was told there was some good apples in the bottom, near Iatan. There was some spraying done near me and it is showing good results already. If I had been able to spray I would have had a fine crop of apples, but the scab is spoiling many of them and now the big green grasshopper is on them thick as bees, so if I get a half crop of poor fruit it will be all I expect. It is and has been very dry and it seems like the insects will get most everything there is. Some trees dying, I think from the big freeze two years ago. Truly the lot of the fruit grower is hard these days. I am as ever,

Yours truly,  
G. T. ODOR.

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Wilson Mo., July 3, 1900.

I am in the midst of my strawberry crop and we have had so much wet weather, my new berry plantings need my attention. I hope you will have an interesting and profitable meeting. Would be pleased to have you people meet with us at La Plata, Mo., when you can find it convenient to do so. Our people here need waking up on the fruit question. Our prospect for all kinds of fruit is not as bright as is Missouri average, as the apples have dropped badly, especially on young trees. Old trees are carrying all they should, but trees six and eight years old have only a few on, yet they bloomed full. Pears nearly all off. Plums full, but the curculio is getting in his work and expect a great many will drop. Have jarred my trees and caught a good many, yet I find a great many of the plums stung.

Cherries will be a fair crop. There will be some peaches, but not many, as our trees took their departure during the cold winter of 1897-'98. Strawberries one-half crop. Blackberries promise well, also raspberries. Orchards where well cared for are making a fine growth, but the canker worm has worked havoc in a great many orchards in this locality and scarcely an owner has done anything to prevent it. It seems to me we ought to have a law to make a man either spray his trees or cut them down, as there are orchards all over this part of the state that are just a breeding place for all kinds of insects and fungi. Michigan has such a law and I think Missouri would do well to follow her example. What thinks our society about it?

Yours truly,

J. E. MAY.

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All fruit trees and berries set this spring are making a good growth, and only a small per cent died, except one order of cherries, which was very inferior when received. Strawberries being picked with good one-half crop but with only a fair quality.

Raspberries coming out fine with an eighty per cent crop—will be ripening in about ten days. Blackberries promising a full crop. Canes in raspberries and blackberries are growing fine. Gooseberries a good seventy-five per cent crop. Peaches, all old snags are full. Plums, falling badly and all reported as being stung. Apples have quit dropping so badly. Some orchards will have a good crop, while others have dropped most all of their apples.

Great deal of complaint about the canker worm. Some orchards entirely stripped of leaves and lots of trees dying.

I am experimenting with some plum trees this season. I sprayed them heavy with Bordeaux mixture as the buds were swelling, then scraped the trees smooth and banded them with leather bands and would go every two or three days and kill what bugs and worms I could find and have sprayed them twice since with Bordeaux and London Purple and think I have a good crop of smooth plums.

G. E. ADAMS,

Darlington, Mo.

Bentonville, Ark., June 1, 1900.

Hon. L. A. Goodman, Secretary Missouri State Horticultural Society,  
Chillicothe, Mo.

The Benton County (Ark.) Horticultural Society holds regular meetings each month of great interest to its members. The local papers kindly publish its reports and these published reports reach a much larger audience than could possibly attend its meetings. The very excellent reports of the Missouri State Horticultural Society are regarded as the best authority on general horticulture published, and second to the reports of no state society.

Apples promise a moderate crop of fair fruit. The spray pump has been in use more than usual. Seedling peaches will be in abundance, but budded peaches scarce. Pears will be a fair crop. Blackberries will be very plentiful, raspberries will be a good crop. Strawberries have not been as plenty as usual, but of good quality.

Very respectfully,  
I. B. LAWTON, Secretary.

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Mercer County Horticultural Society as was reorganized February, 1898, is doing good work.

It has charge of the horticultural and agricultural departments of the Mercer county fair and is making it a leading feature, an interest usually so neglected in our fairs. Perhaps the most interesting feature of our society is the experiment grounds which at present consists of 110 varieties of apple, 35 of pear, 24 of plum, 25 of peach, 8 of cherry, 30 of strawberry and 12 of grape. This planting was begun two years ago and we are adding new varieties from time to time as we can.

Anybody having varieties of fruit of merited quality who would like to have them thoroughly and impartially tested in our locality, will please write to the director of experiment grounds, H. S. Wayman, Alvord, Mo. We will be glad to have them if not already on our list.

We organized a junior class in horticulture last year, consisting of about forty boys and girls. The class is taking considerable interest in the development of the experiment department and several new members have been added to the class.

We think that by beginning in time and bending these "twigs of society," we will some day be able to show some developments along the line of horticulture that any county might well be proud of.

## THE CHERRY—VARIETIES AND MANAGEMENT.

G. P. Turner, Meadville, Mo.

The conditions as they are in this part of the state are by no means ideal for the growing of cherries. The three greatest drawbacks to the industry are hardpan, birds and curculio. To be successfully grown the cherry must have a well drained soil, and this we can not boast of to any great extent. Not that we have not situations high enough and rolling enough, but they are usually underlaid with a sub-soil so hard and compact as to not readily absorb and carry off excessive moisture. It is, therefore, highly important that we plant only on our highest and driest soils and if these can be made drier by the use of tile or otherwise, we shall approach more nearly the ideal situation. The young trees may grow very nicely for several years on any soil that will produce good corn if the seasons happen to be moderately dry; but when they encounter one of those seasons that we sometimes have when the ground is soaked and soured and scalded for weeks at a time they give up the fight for life against such unequal odds, thrifty and well established though they may be. On account of the other two drawbacks—birds and curculio—we are kept from growing many of the finer varieties. Both of these enemies evidently know a good thing when they see it, for they show a decided preference for those varieties. While the birds commit serious depredations among the cherries, we must forbear this evil for the good they render us in other ways. If only a few trees are grown they may be protected by a netting made especially for that purpose; or some other fruit of which the birds are fond, such as the Russian mulberry, may be grown for the birds. Where cherries are grown largely for market, the few that the birds take are not missed. I can not quite so readily overlook or forgive the mischief wrought by the curculio. "The little Turk," as he is sometimes called bobs up serenely every year and while the fruit grower is saying hard things about him he very quietly and unostentatiously goes about his work. So modest is he in fact that we fail to

detect his presence till we see his peculiar mark on the fruit. There seems to be no sure or satisfactory way of exterminating this insect. All that can be suggested is preventive measures to hold him in check. If the poultry have the run of the orchard and are fed under the trees they will certainly destroy large numbers of the insect. Again if the wormy fruit is gathered in a separate vessel and fed to hogs or otherwise destroyed it will tend to diminish the insect crop for another year. It is only by taking these and other precautions that we can hope to keep the insect in check. Notwithstanding the drawbacks mentioned—and they are all important enough to call for serious consideration—some varieties of cherries may be grown with profit. But the majority of varieties catalogued will prove to be a source of vexation and loss.

In my own orchard of three hundred trees I have planted nothing but Early Richmond and Montgomery. The latter is unquestionably the most profitable cherry I have ever grown. It is larger than Early Richmond, and a week or ten days later and in quality is superior to that well-known variety. It is a regular and annual bearer, while for shapeliness and symmetry of form the tree can not be excelled. I have tried Olivet, May Duke, Louis Philip, Belle Magnifique, Dye-house, Empress Eugenie, Late Kentish and several other kinds but have found them all unprofitable. About the planting of cherry trees there seems to be some difference of opinion. Some do not like to plant in the fall because the cold weather seems to evaporate all the sap from the tree giving it a shrunken appearance. The same might be said of the apple, and yet experience teaches us that there is no better time to plant the apple. I have planted cherry trees in the fall for several years past and have been uniformly successful. A good mound of dirt thrown up around the tree will insure its coming out all right in the spring. Again there are not a few tree planters who say a cherry tree should not be cut back at planting time. I have never had it explained to me just why this is advocated. In general we cut back a tree to reduce the number of buds so that the sap may be bestowed on a few buds causing them to grow vigorously, and not be distributed among a large number of buds with not enough to cause a good strong growth on any of them. This being the case, I can not

understand why it will not apply to the cherry as well as to other fruit and deciduous trees. Another mistake in growing the cherry is in planting the tree too deep. All cherry trees are supposed to be on Mahaleb, Mazzard or some other non-sprouting stock or root. This stock should all be beneath the ground, but the scion or trunk of the tree should be altogether above ground. That is, the union between stock and scion should be at the surface of the ground. If the scion be planted below the surface of the ground, it will of course send out roots of its own, and sprouts are the result.

I have noticed quite a variation in cherry trees of the same variety, some growing uniformly large and fine fruit while others grow only small or medium sized fruit. What the cause of this variation is I have not been able to fully determine. I think I am safe in saying it is caused by one or more of three things—soil, stock or selection. I have trees of the Early Richmond on my place growing in the same kind of soil, so far as can be ascertained without a chemical analysis, that show this variation. I have the same variety on Mahaleb or Mazzard stocks and there is a slight difference in the size of the fruit in favor of the Mazzard. But I am inclined to think that more important still is proper selection. In principle, plant-breeding and animal-breeding are the same and we know that animals are bred to their highest degree of perfection only by careful selection. It is certainly wisdom to use the same care in propagating our trees and plants.

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#### Discussion.

F. Holsinger.—My success is in cultivating, preferring Richmond, Montmorency, Morello and Dyehouse. Wragg is on the decline.

#### Insects.

Prof. J. M. Stedman.—There are two species of canker worms; one becomes adult in the fall, sometimes not until the latter part of



December, the other from January till May. The two species look alike; the male has two wings like an ordinary moth, while the female has no wings and is like a spider. She crawls up the tree and deposits her eggs which hatch out as measuring worms. The larva eats leaves for two weeks, then drops down from the tree, buries itself underneath rubbish where it spins a cocoon and remains until October. The best way of fighting this pest is to prevent the female from crawling up the tree; a band of tin made to flare, or brown paper smeared with printer's ink will act as barriers or a cotton batting will tangle her feet so she can not get away. The following excellent method has been patented; cut a four inch band of wire-netting, lap it two inches around the tree, then cut the upper edge several times down an inch or so and tack to the tree so it will flare out at the bottom. If you get them on your trees you must spray immediately. One pound of Paris Green and three pounds of lime in 135 gallons of water will reduce them. Arsenate of lead is easy to spray and does not hurt the foliage. Dissolve four ounces of arsenate of soda and eleven ounces of acetate of lead in a bucket of water, arsenate of lead will be formed, add this to seventy-five gallons of water. We tried the dust spray last year. It is a success except that too much care is required to make it stick as we can not always wait for exact conditions. Lime will kill the worm when it is half grown. Ten per cent of kerosene kills them easily.

G. A. Smith.—I use a spray made of one pound of white arsenic of lead, four of sal soda in one gallon of boiling water. With this I used ten pounds of lime and 300 gallons of water.

Goodman.—We use Paris Green both in water and as dust spray. Lime is also a fungicide and is good against codling moth, combined with one pound to twenty of Paris Green.

Prof. Stedman.—The apple bombycid eats the outside of newly-formed apples. It works with the canker worm and the same spray kills both. The climbing cut-worm is an old acquaintance and to be fought with bands of cotton or the same spray.

The flat-headed borer lives one year in a tree; the round-head for three years. The beetle is brown, with long antennae, and white stripes down the back. The eggs are laid in crevices. The larva

works first in the cambium layer, next in the wood and finally round the tree and through it. A wash should be applied during the spring to prevent the laying of the eggs. Afterwards a few will need to be dug out. Lime wash with tobacco and soft soap will largely prevent depositing of the eggs, but not absolutely. In catching insects with trap lanterns, there will be one codling moth to 300 lanterns, while large quantities of enemies to the moth will be caught and destroyed.

Prof. Herman von Schrenk.—Diseases on roots are difficult to fight. The gall grows and chokes the trees. Infected plants should be avoided as the disease also comes in the nursery. It is communicable through the soil, so do not have knotted trees around healthy nursery ones. Pull up the tree and burn it and then do not reset in the same hole, remove all roots and fill in with different soil. The yellow spots of rust on apple leaves are started from the fungus growth "cedar-apple." There are laws in New York to prevent cedars from being planted near orchards. The spores germinate in the spring and are carried to the apple leaves.

J. C. Evans.—I recommend hot lye for curl-leaf on the peach, a gallon of strong solution may be put on the bare roots.

Prof. Whitten.—Lime dust with strong Bordeaux sprayed onto peach trees prevent leaf-curl.

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## THE PLUM.

J. J. Kiser, Stanberry, Mo.

Some years ago, in the city of Stanberry, I saw a man selling native wild plums as fast as he could measure them from the wagon in which they were brought loose, at \$2 per bushel. They were small, green, blue, brown, yellow, good, bad and indifferent, more bad than

indifferent, more indifferent than good, and on the whole a sorry looking lot.

The inquiry naturally arose in my mind: are some people so plum hungry as to pay such prices for such stuff? If so, will they not pay as much or even more for something that looks and is more fit to eat? And again—if so, why not raise some? But here a problem presented itself for solution that with me at that time was a puzzle. I did not know who had the information to give that I needed; life is too short for me to commence where people began fifty, twenty or even ten years ago. I wanted the benefit of others' experience, take position in the advance guard and commence at the place that others had arrived at, but, having just moved to the state, and not being in touch with, and not even having heard of the pioneer veterans of horticulture of our state, not even knowing that there was a horticultural society, I relied on my local nurseryman to furnish me with about a hundred plum trees. One-fourth were Wild Goose, one-fourth Robinson, one-fourth Potawatamie and the rest Satsuma. Of the last I have never got a plum and I would now be many times the first cost of the whole outfit better off, had they all been Wild Goose and Robinson.

Later I set many other varieties including Lombard, Strawberry, Pooles Pride, different varieties of Damsons, some of them puffed (I say puffed advisedly) very highly. Then I began setting Japs, and I must say that for something good to eat, the Abundance takes the cake. My better-half had always sounded the praises of Kentucky peaches against my recollections of the sweet cherries of my boyhood days in Switzerland, but admitted that Abundance plums were the best thing she ever tasted.

After that I set a hundred Gold and in the summer of 1897, I had good reason to feel an honest pride in the results of my planting and care and look forward to abundant harvests of nearly all the good things that the horticulturists' genius had made possible to grow in this climate, when that terrible calamity—the combination of a bad summer, a worse fall and the worst winter of 1898 and 1899 overtook my dreams and my choicest of fruit expectations—those things that I had especially prided myself as having something a little better than

anybody around me—dissolved into mist, or rather congealed into frost and ice. Ah! my neighbors said, you had better stay near shore; but I did not know half the extent of my damage when I was found planting again. I told them the story of the darkey, who, aboard an old man-of-war during battle, stuck his precious head into the breach made by a cannon ball shouted: "You can't hit that spot again!" So I sincerely believe we will never see just such a summer, fall and winter again.

### Have We a Sure Plum?

I think so. The Wild Goose, the Ben Davis or Concord of plums has never failed with me yet, either in tree or fruit except one season when a freeze near the middle of May killed them when they were as large as beans. They were the first crop, too, and some of you possibly can guess about how I felt. But it must be loudly, deeply and broadly emphasized that the Wild Goose must be planted with some variety blooming at the same time; it just will not bear fruit unless cross pollenized by some other variety and I have found Robinson not only good for that purpose, but although rather small, my neighbors declare it to be the very best for cooking—much superior to Wild Goose.

Some of my one hundred Gold, that were planted in my poorest soil have escaped destruction though somewhat damaged. Some few are fruiting the first time. I have planted fifty more of them this spring. I saw an orchard said to contain 500, near Turner, Kansas, this week that are loaded with fruit.

I have quite a number of varieties that are fruiting for the first time this season, and others that ought to have fruited before this and would have done so had it not been for bad seasons.

Having added this account of my limited experience as an atom to plum literature, I leave the great bulk of what I don't know to the discussion of the experienced members of this society, trusting that we may all be able to obtain reliable information concerning the successful culture of this very desirable fruit.

## CAN NUT TREES BE GROWN FOR FORESTRY PURPOSES?

By S. Miller, Bluffton, Mo.

I don't see why not. Our forests are being cut down at a rate that will be surely felt by future generations, unless some planting be done.

The nut family have an advantage over the other forest trees, because they are all handsome trees, and their nuts always in demand. Now comes the question what shall we plant? I would begin with the common Black Walnut. It is as easily grown as so many grains of corn; is a fast grower, bears a valuable nut, and the timber is among the most useful. I know of an owner of one-fourth of a mile on each side of a thirty-two foot public road that the trees were girdled to kill them, and afterward cut down, mostly for firewood. This was twenty-five years ago. These trees if left until now would be worth nearly \$1,000. Destroying simply because they injure the farming crops along the road.

Hickory Nuts are also in demand, and while not so fast a grower as the walnut, is a handsome tree and the wood among the most useful for manufacturing and fuel.

There is quite a variety of them; some small and bitter, others large and have excellent meat in them. Here near me are trees that I would not take \$50 for if on my land. They are also easily grown. Put in the ground in the fall, and when very dry, they will grow if put in the ground in the fall. I had some in my care four years that I put out as an experiment and they grew. The past year I have sent walnut, hickory nut, pecan and chestnuts all over the country.

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The Pecan.

This is a commercial nut, and will in time be planted if people know their value. It is usually found on our river bottoms, but it will grow on upland, comes into bearing in about ten years.

A friend of mine, six miles from here, has a grove of near one hundred trees, grows wheat and grass on the ground, the wheat nearly

as good as on land without trees; yet some seasons he realizes as much from the nuts as from the wheat crop. A singular thing about this grove, no two of the trees bear nuts alike. One tree bears nuts twice the size of any other tree in the lot. These I have been buying from time to time for the past ten years, usually paying him double the price of the ordinary ones. One season I paid him eight dollars for the crop of this one tree. Have raised thousands of seedlings of them. One season I furnished the Agricultural Department at Washington, nearly one thousand, which were distributed all over the country. I have a tree of the Hickory Hybrid (a cross between the Pecan and Hickory, large enough to bear nuts. It is a novelty.

### The Chestnut.

Of all the valuable nuts this seems to be the most neglected. Easily grown and comes into bearing in six or eight years. The American Sweet is the best in quality, but some of the foreign and their crosses are good and much larger than our natives. There are thousands of acres of rocky, hilly ground in this vicinity that they would flourish on and the day may come when they will perhaps be planted.

The tree is a fast grower, a perfect beauty and will outlive generations of the sons of men. A few days ago a man wrote to me for one thousand to plant, but they are too far advanced to transplant now.

An interesting thing in my nursery of these seedlings, is, one tree is entirely different from all the others. Has foliage nearer like the holly than a chestnut. So different from the rest that I suspected a strange seed might have been among them; its root was examined, and the chestnut still clung to the tree.

I like money perhaps as well as the ordinary man, but it would take a pretty nice sum to buy that tree. It will be left standing where it started as long as the land belongs to me.

I have seen chestnut trees six feet in diameter and seventy feet high, that bore bushels of nuts in a season. In the mountains in Northern Italy, the chestnut comprises the greatest part of the food

of the inhabitants.

Among my friends in the East, forests of chestnut trees are cut down, and when the sprouts are a few years old are grafted with the improved varieties, popular among which is the Paragon. This latter I have in bearing, and prize it highly. Chestnuts for planting should not be left to get dry, either planted at once or packed in sand and exposed to the weather outdoors.

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#### Discussion on Nuts.

J. T. Jackson.—I planted walnut and hickory for posts on the line of fence and find them better than white oak.

L. A. Goodman.—Some nut trees are only polenizers; the nut bearing ones need these for the pollen.

Wm. H. Barnes.—If we plant nuts they ought to be the best varieties. Some chestnuts have seven plump ones in a burr.

J. T. Snodgrass.—The Texas soft shell hickory nuts bear at sixteen years of age.

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#### Discussion on Plums.

G. A. Smith.—The fourth year my Wild Goose plums on the south side in sandy soil were worth sixty-five dollars; the fifth year, forty-five, and the sixth thirty-five.

Goodman.—Some strains are almost perfect self-fertilizers.

Kiser.—The "Sloe" is worth planting, the taste is between cherry and plum and is fine.

Miller.—We need to catch the curculios or we will have no plums. There is one kind said to be curculio-proof as it is so hard when green the curculio can not puncture it.

The society adjourned until evening.

## CULTIVATION AND CROPS IN THE ORCHARD.

J. T. Jackson, Chillicothe, Mo.

The Bible is not a work on horticulture, yet the following parable (Luke 13:6-9) may profit we fruit men by its advice:

A certain man had a fig tree planted in his vineyard; and he came and sought fruit, and found none. Then said he unto the dresser of the vineyard: Behold these three years I have come seeking fruit and found none; cut it down, why cumbereth it the ground? And he answered and said unto him, Lord let it alone this year also, till I shall dig about it, and dung it. And if it bear fruit, well; and if not, then after that thou shalt cut it down.

I believe that fully three-fourths of the apple orchards of North Missouri are in the same condition as this man's fig tree. They have not been thoroughly cultivated, nor have they been properly fertilized. But on the contrary, as soon as an apple orchard is set out it is planted in corn, raspberries, blackberries or sown in oats, or left to grow up in weeds or blue grass or made into a calf pasture. So that the poor trees are starved to death for want of necessary food, or are eaten up by worms for the lack of proper cultivation. Consequently the owner comes seeking fruit, but behold there is none, or if there is any, it is small, not half developed, wormy and almost good for nothing.

Illustration.—If a farmer after planting a field of corn should say, "Why leave so much space around these hills of corn? Why not occupy this vacant ground with potatoes, oats or some other crop? I will raise two crops at once and not one as I see my neighbors are doing." But would he? No. Every intelligent farmer would say: "You can not raise corn and potatoes or corn and oats at once on the same soil. These must be sown or planted in different fields. The space around the hills of corn is absolutely essential to let in the air and sunshine and use the cultivator, if not, weeds and grass will take possession, and but little or any corn will be harvested."

As with corn so is it with apple trees. The thirty feet of space around the apple trees is just as essential to the apple as the four feet



of space is to the hill of corn. The apple tree should not be robbed of the air and sunshine and the fertile soil around it any more than a hill of corn.

Then let us have done with such treatment of the best fruit which God has given to man.

Plant your apple trees thirty by thirty feet. Cultivate the soil thoroughly one way with a disk harrow and cross cultivate with the Acme. This cultivation will keep the ground level. Keep it more moist in a dry season than if the disk harrow is used alone. This will bring about what we term "a dust mulch," a very essential thing to secure if we want our apples to grow and to fully develop when the dry weather of July, August and September too often occurs.

Now, instead of robbing an orchard of its food by planting corn or anything else, I would add to it by seeding to clover for two years. Do not remove the clover from the orchard but let it grow up and fall down, being careful to leave space on each side of the row of apple trees to cultivate, alternating with clean cultivation the entire orchard until it is in full bearing. This thorough work gives your trees a healthy dark green foliage, and does more to remove the insect pest from your orchard than all the spraying and dusting outfits ever invented.

Clover is the cheapest and best fertilizer ever used in an apple orchard, and never fails to store up food in abundance to last the apple orchard its natural life.

Those who neglect to cultivate their orchards, but depend on spraying and dusting are like some people who neglect the simple laws of health, but dose themselves with patent medicine.

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I will advise all people to plant orchards and take good care of them. If they don't do this, their time and money is thrown away. From my long experience I think only a few people are careful enough with their orchards. Hogs will soon ruin the orchard by rubbing against the trees when the hogs are wet from wallowing in the

pond. The wet hog pushing his weight against the tree soon ruins the bark and the sap vessels of the trees are thus injured. All kinds of stock should be kept out of the orchard.

W. McCRAY, Cowgill, Mo.

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## THE PEACH.

By Geo. A. Stone, Richmond, Mo.

The peach is the most delicious and wholesome of all our orchard fruits and every farmer, for his own pleasure and the pleasure it will give his family—especially the frugal and faithful wife—should have a number of peach trees of first class varieties.

We often hear the remark made by men who ought to know better, that the seedling trees are the only kind to plant this "far north," as these fine varieties of budded peaches, they say, are too tender for our uncertain climate.

I must differ with my old friends at this point, for in my ten years experience in growing peaches I find that any season that seedlings bear, I have just as good a crop of the budded peaches. I have both kinds in my orchard situate on the high bluff lands bordering the Missouri River. My seedling peaches although an average size, are not worth the expense of picking and marketing. The budded peach will produce as many bushels to the tree as the seedlings, while their value is fully three times as much. I have frequently driven into town with a lot of fine large rosy-cheeked peaches, carefully picked and assorted, and attractively displayed in baskets and sold them at one dollar per bushel to customers whom I knew had refused, not ten minutes before, to buy seedling peaches from my good neighbor at twenty-five cents per bushel. Those buyers knew what they were doing. They well understood that a bushel of those small peaches would turn out three pecks of seeds and parings and one peck of fruit, while the one dollar peaches would give them three pecks of fruit to one peck of

seeds, to say nothing of the time saved in preparing for use and the delight afforded the eye as well as the palate in seeing and eating the best on the market.

When I want to plant a peach orchard, I prepare my ground by plowing deeply and thoroughly harrow, check off, with a plow, the distance I wish to plant, say eighteen by sixteen feet, then go to the nursery, if near by, and select good stocky one-year-old-trees, cut all roots back to three or four inches, open a good wide hole, set the tree an inch deeper than it grew in the nursery, shovel in some fine mellow earth—never use wet dirt—shake the tree up and down to get the loose earth well among the roots, then tramp down firmly; finish by filling the hole and round up around the tree, don't tramp, but leave the top dirt loose for a mulch.

When trees are planted in this manner, there is no need to have their lives insured, for every tree will live if in a sound, thrifty condition when planted. Cut back all side limbs to two or three buds, and when possible leave a center limb so as to train a pyramidal shape. Cultivate and keep trimming back every year by cutting away one-half to two-thirds of the annual growth so as to have a low strong and well balanced heart. A strong stocky head is very essential. If you have a wide spreading tree with long extended branches, the weight of even a moderate crop will break off limb after limb until you have nothing left but a ragged stump to start a new tree from, or better to dig out entirely. The first two or three years corn or potatoes may be planted in the peach orchard, or thoroughly cultivate and keep down all vegetation until the middle of August. Don't forget to search out all the borers at least twice each season, and keep the rabbits away in the winter. In marketing peaches I carefully pick and as carefully assort, using peck baskets and cover with pink netting; the pink gives the fruit a fine attractive appearance which lovers of peaches will not resist. For home or near by markets, I do not gather until the fruit is well colored and some are even ready to eat out of hand; by this method the full flavor is obtained and satisfaction given in every instance.

It is very little trouble to grow the peach in this state, but I have not been successful in keeping off curculio and we have a severe winter

now and then that will kill a part of them. The winter of 1898-99 killed many of my trees and those not killed, were seriously damaged. The peach, naturally, is a much longer lived tree than many people think them to be. A neighbor has some trees now twenty-five years old and in fairly good condition. They bear fruit every peach year. These trees are seedlings and referred to by my neighbors favoring the seedlings as proof of their contention as to the value of seedlings. However, I can see no reason why the budded tree will not live as long with proper care and attention. By all means have a few peach trees.

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THURSDAY, 8 p. m.—Seventh Session.

Music for the session was given by the young ladies at piano and violins.

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CULTIVATION OF THE GRAPE.

By B. A. Jaudon, Palmyra, Mo.

In an experience of fifteen years in growing the grape I find it is the most certain of our fruits to yield a crop. For this reason I have made a specialty of growing the grape in a small way as an amateur. In fifteen years I have not failed entirely any year to have grapes, which I can not say of any other fruit on my grounds.

I have found the fall season the best time to plant the vines and also to prune the grapes. In planting the vine mistakes are frequently made in not planting deep enough. The vine should be planted with three buds; two of the buds should be planted below the surface and the third at the surface of the ground. The preparation of the soil

should be done in the usual way, and cultivation should continue throughout the summer.

In training the vine I adopted for some years the system recommended by Mr. Fuller, in his work on grapes, of what he calls the "two arms" system, and while it is a good one it requires more care and labor than is profitable or necessary. So of late years I have trained the vines in what is known as the "fan shape" system, having from two to five growing from the roots and every year cutting out the old vines and leaving the young and vigorous shoots to bear the following season. In the two arms system the renewal of the vine is not so easily made and requires more care than is generally taken. But it forms a beautiful trellis. To the amateur many hours may be devoted to arranging and tying the vines to the wires, but to the one who is looking for the least labor and most profit would no doubt prefer the renewal system of training.

The amateur takes great pleasure in the propagation of new varieties by hybridizing and seedling grapes. Out of about 1,000 there are two vines that are worth propagating and two others that are nice but not as good as many old ones.

I have been very much interested every year in grafting the grape. The uncertainty about its success only adds to the interest. My first success was in 1885, when a graft of Wilder grew on a wild vine of very vigorous growth. That is now the best vine that I have. The berries are frequently an inch in diameter, compact and coming so near together as to press in their sides. The bunches are large, and the berries coming together as they do, they present the appearance of a mass of solid meat. On no other vines of Wilder is seen the same perfection in the fruit. Iona and Jefferson are increased fifty per cent in their bearing capacity by being grafted upon a vigorous vine. Many worthless vines are changed to good ones, and then the saving of one or two years in having the new vines to come into bearing. My interest in grafting has led me to read everything I find upon the subject. Some of the writers have been very successful, having attained to as high as 95 per cent. I have followed their directions as best I could. I have been operating as a surgeon for forty-seven years and have ac-

quired sufficient nerve to operate in most cases, but my success with the grape from year to year would hardly exceed twenty per cent. This year March 27, grafted thirty-four vines; April 30 their condition is favorable in twenty-seven cases and in seven no signs of life. May 30 (to-day) seventeen grafts are alive and give hope of growing, but by June 30 if there are eight growing I shall be satisfied. After trying all the different ways and plans, including grafting in the fall, as recommended by Fuller, the usual way, by the simple cleft early in the spring before the sap rises, is in my opinion the best. There is one thing that should not be neglected, and will add much to success, is to have the graft well shaded, and for this purpose pieces of tile ten inches in diameter and twelve inches long are well adapted, the condition of the graft being readily investigated and the sprouts seen and pulled out readily. The upper end of the tile should not be closed, as the ants will frequently spoil the work.

Bagging the clusters has become almost a necessity to preserve the integrity of the bunch. It prevents its destruction by the birds, keeps it clean and pure, improves its quality, preserves its bloom. Some kinds are improved much more than others. When bagged early it prevents the rot. A comparison of the bagged and the unbagged will convince any one.

I have more than one hundred varieties of grapes. Most of them have been bearing for years. Some new ones, such as McPike, Campbell's and Hicks, together with twelve new ones of Munson's, have not yet fruited. Of the white grapes the best are Green Mountain, Niagara, Lady Washington, Hays and Empire State. Of the reds I prefer the Catawaba first, then Agawam, Brighton, Lindley, Salem, Delaware, Iona, Jefferson, Massasoit, Ulster and Vergennes. Of the black, Wilder, Worden, Mills, Aminia, Barry, Early Victor, Herbert, Norton, and Concord. Prof. Munson of Denison, Texas, has introduced many very excellent grapes. Some of them are the best in quality, productiveness and hard wood. With me they endured the cold of 1898 (30 degrees below zero) better than even the Concord. The Beacon is firm in quality, very large bunch. The America is most prolific, of

a peculiar but pleasant taste. I have twelve more of his planted that have not yet fruited.

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Recitation.—Master Barton Robnett.

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### GOOD FLOWERS.

Mrs. Emma P. Tracy, Chillicothe, Mo.

Mr. President, Ladies and Gentlemen:

One of the administrative tasks of the Maker of all was the organization of the vegetable kingdom, and the emphasis laid upon the good and the beautiful is unmistakable; there is nothing accidental about it; one thing serves another to but one end. John Keats sums up the matter by saying that "The thing of beauty is a joy forever." Then to be good and beautiful must logically be an ecstasy of joy forever.

There is something inspiring about the fact that nature's gold and perfume are never wasted, but rather distributed with lavish liberality among those who appreciate her gifts. Thomas Grey's utterance about the unheeded flower amounts to unqualified pessimism; no blossom ever wasted "its sweetness on the desert air." There never was a flower born and lived its beautiful life for nothing; go among the flowers with an eye single to their worth, and the fact will be demonstrated in a most satisfactory and convincing manner.

The march of civilization destroys in a measure the face of nature, but man has ever made an effort to subdue and convert all of nature's gifts to his personal welfare. Tauser in 1562 gave five hundred points of good husbandry, so many of these points have been amplified in the deliberations of the earnest, investigating minds of this meeting that one must feel that every person is, every day, placed under obli-

gation to the great array of earnest men who have tamed the wild plants by training them for special service; some to yield fruit, others vegetables, others flowers, and of the kinds that add to the blessings of humanity.

Horticulture is essentially a home making industry, whether on a large or small scale is made successful by skill of hand, a quick eye, a nicety of perception, and is an occupation quite suited to women; especially is this true where it is easy to get the rough hard work done without having the laborers in any way connected with the household.

What matter if the neighbors, and friends ask critical questions; even make suggestive assertions of failure, your venture has been financially small; the outdoor exercise, the development of muscle, the experience with nature will more than compensate for the venture, even 'tho disappointment comes. Every success was built on some one's failure, and if such wounds need a balm of healing remember that a member of the Millionaire Farmers' Club of New York City had some friends to dine with him at his country home on the Hudson, and offered his guests the choice of milk and champagne, saying, if you want to drink something that is truly expensive, I beg that you take this milk and let the champagne go. We estimate that the milk costs five dollars a quart, while the champagne costs only three dollars per quart. Every strawberry, every bean, every potato, every carnation is worth its weight in gold. This verdict from a successful business man, a member of the most exclusive club in America, leads us to know that none but Mulhall, the statistician, could estimate the cost of such venture. But the experiments are interesting, and in the end will help the real horticulturist, who will benefit by what their more fortunate brothers have learned at great expense, and perhaps loss of vanity as well.

Out of our efforts, achievements,

Out of the thought, grows the act,

Out of our failure, success,

Out of the error, fact.

Flowers are the poetical side of horticulture. Progress has been great in this line, and societies of roses, carnations, chrysanthemums,



etc., are being formed each year. These organizations accentuate the fact that things become good to us only when we recognize what they are, and the uses for which they are designed and best adapted.

To the chemist those flowers only are good that yield a perfume acceptable to the civilized world, and at the same time bring in a revenue that add to his bank account.

The caprice of fashion, or the individual taste of one high in political life makes good the flower that becomes the fad of the season. Disraeli (Lord Beaconsfield) admired and wore the primrose; it became the good flower to the London florist. The carnation, or divine flower of Jupiter, is the good flower to the florists of Germany and Italy, and from whence we obtain the choicest varieties. Chamomile, Safron and Senna were the good flowers of our grandmothers, and everybody's face in their immediate circle was, sooner or later, made to reveal the tortures of a nostrum that must be forced down unwilling throats that they might be spared the agony of colic "throw out the measles," or save their lives from the ravages of imaginary worms.

The White Poppy of commerce is good to line English coffers with tariff money, and to exercise the charities of a world to save from death by hunger, a multitude of benighted minds living in a stupor worse than death, because of this insatiate greed for gold.

It is a matter of gratitude that this beautiful gift of nature is most profusely given; flowers can not be monopolized yet. In 1637 it took nothing larger than a tulip bulb to drive the Dutch nation mad with speculation. It took years for the country to recover from the disastrous results of this mania, and to-day Holland's florists find the tulip bulb the good flower for European and American gold. The flowers that find their way to the sick room, the prison, the hospital, carrying a message of sympathy, hope for better things to come, and a benediction to the soul of the receiver from the heart of the giver, are the good gifts that toil not, neither do they spin. Yet Solomon in all his glory had not the wisdom contained in the silent inspiration for higher and better conditions that these good flowers bring.

The flowers distributed by the charity missions of our large cities to the children of the slums, to be cared for by them, and brought to

the perfection that a florist demands, gains for them not only a prize, but develops patience, forethought, determination, love of the beautiful, an insight into nature's demands, and becomes the good flower of that child's life in the degree that any, or all of these requirements are met.

It requires an education to admire Sargents friezes, McMonimes statuary. No such thing is required to appreciate and love flowers. They go forth as messengers, as affectionate tokens of remembrance, presents of beauty, and are universally accepted. It is not impertinent to offer flowers to a stranger, the poorest can give them to the richest. All humanity recognizes a brief brotherhood in them. When the very poor bring their little floral gift, hard is the heart not touched with gratitude for the flowers that give expression to an affection that must speak. Being deprived of all else, these flowers prevent their being shut out from the exquisite pleasure that springs from such gifts, then when death comes, and the heart aches to do whatever can be done that shall speak of love. It takes money for fine linen, money for sepulture, but flowers the poorest may love. Pansies, mignonette, violets, if it be winter, a geranium. Then if a stone can not mark the burial place, a rose may stand there, and every spring, as the flowers fade and come again, year by year teaching a lesson of the resurrection, when that which perishes here shall revive again. Truly flowers, good flowers, know no condition, recognize no social supremacy, and may line the path of all from the cradle to the grave.

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An original poem, presenting much advice on fruit growing and varieties, was read by the author, J. Y. Powell.

Prof. J. M. Stedman gave an illustrated lesson on insects describing a typical insect, its structure and anatomy, method of reproduction and habits. He also characterized the larva and pupa stages. After showing these in models, Prof. Stedman sketched in rapid survey with

the aid of lantern slides the strange forms, life histories and habits of many interesting insects.

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Cowgill, April 21, 1900.

Mr. L. A. Goodman, Westport, Mo.;

Dear Sir:—I send you to-day two points of stakes of the osage orange. These stakes stood in the ground about fourteen years. The sap part only seems to be injured; the heart or yellow part seems to be sound. I have used the Osage orange for posts for the last fifteen years. I have thousands of them from one inch to six and seven inches in diameter. When we put one of these posts in the ground it will be a good post for a long lifetime. The yellow part of the wood seems to be composed of a combination of substances that is almost indestructible. I have plenty of good oak post-timber convenient to my place, but I never think of going there for a load of posts, as they would not last but a few years. I don't think the great value of the Osage orange for posts is yet known. Some of mine are large enough to quarter and the first cut makes four posts. Now, I will say I have no hedge posts for sale. They will be here for my children when I am no more. All of our farms have little places not suitable for cultivation; why not grow posts on such places? I give the neighbors seed if they will come and get them in the fall of the year when the apples fall.

Yours truly,  
WILLIAM McCRAY.

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### MUCH NEEDED HELP IN ORCHARDS ALL TIMES IN THE YEAR.

By Conrad Hartzell, St. Joseph, Mo.

American orchards are overrun with insects.

There are too many short lived, short body, short profit and short crop trees; too many trees to the acre, too many hours work for man and woman; too much discouragement. A change is very highly nec-

essary "very soon." "Good Fruit" is most desired and pays best.

The orchard must be dressed and kept. It is possible to cleanse the orchard. Yea, it is easy to dress and keep the orchard. All orchards need attention; time is necessary; thought and action at the right time. There is a time to do all things. Insects in the orchard live through winter when not disturbed. Good winter cleansing is far better than spraying. Best helps are always the cheapest, every time.

We can, if we will in Missouri, have good fruit every year, and every day in the year, if we will, with less labor than we have been doing. We must first believe the truth and then act.

Horticulturists have plenty to do without taking the most difficult way of accomplishing their object. In Missouri we all know we can have good fruit, and can have it in great abundance, and can have it—in profitable good shape—if we will. We must help each other. We must have law. We must have order. System is necessary. A right beginning is the first great necessity. We must not distrust everyone. We are not politicians.

Committee work is one good way to begin.

Man can govern all other creatures, and, we believe, man can govern mankind. We know that organized effort is great. We are sure, now, that concert of action on our part in Horticulture is most necessary. We should have legislative protection and it will not come without an effort.

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The Livingston County Horticultural Society unanimously passed the following resolution:

Whereas, In the estimation of this society there is no subject of more importance to the entire community than that of horticulture, and that much information is obtained by and through discussion and the exchange of ideas and experiences, on this very important subject. Therefore be it

Resolved, That this society extend a vote of thanks to the State Horticultural Society for its kindness and courtesy in coming to this

part of the state to hold its semi-annual meeting, whereby much information has been imparted to this community, and our local society; information which will be of lasting benefit to us all.

J. Y. POWELL, Committee.

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## REPORT OF COMMITTEE OF FINAL RESOLUTIONS.

To the Officers and Members of the Society:

Your committee on final resolutions would report as follows:

The Missouri State Horticultural Society, in session at Chillicothe, thanks to the people of Chillicothe for the reception and welcome of our members. We thank the officers and faculty of the Chillicothe Normal school especially for their hospitality and entertainment.

We express thanks to the newspapers of the city and of the state at large for the interest taken in the meetings of the society, and for notices given the work of the society.

We thank the individual members of the society for having left work at a busy time to devote several days to the discussion of horticultural topics. We also thank the visitors from our neighboring states for their presence and for the part taken in the program. We thank those who have taken part in our program by furnishing literary and musical numbers, especially the young ladies whose music we have enjoyed so much.

We feel it is fitting to congratulate the great state of Missouri for the splendid showing made by her fruit at Paris. We also thank the persons throughout the state for their co-operation in this work, and ask their assistance in making an exhibit at Buffalo next year.

We regret the lack of interest on the part of some of the railroads in creating an interest in fruit-growing along their lines. This lack of interest is shown by our inability to secure a straight rate of one fare for the round trip. We believe the sentiment left with any community after a meeting of the Missouri State Horticultural Society will be such as to induce a more general planting of fruit, and the consequent

improvement of the condition of the farmers. We approve of the steps taken by our officers to secure a one fare rate, and hope their efforts will be successful in future.

J. M. IRVINE,  
T. B. CHANDLER,  
J. T. SNODGRASS.  
Committee.

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On motion the society adjourned to meet the first week in December.



# WINTER MEETING AT FARMINGTON.

December 4, 5, 6, 1900.





# WINTER MEETING.

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## FORTY-THIRD ANNUAL SESSION,

*Held at Farmington, Mo., December 4, 5, 6, 1900.*

### FIRST SESSION, TUESDAY, DECEMBER 4.

The members of the society began to collect in the opera house early in the morning and arrange the fruits and flowers.

Never before were there so many of the good people of the town on hand to help decorate our place of meeting in the fine opera house. Every one in town who had plants, flowers or decorations brought them as an offering to the meeting and the young people of the town vied with each other in doing for this meeting, by adorning the hall with flags, bunting, evergreens, festoons, flowers, plants, and fruits until the hall was one bower of beauty and the tables one hundred and twenty-eight feet long and three feet wide, were filled with about 500 plates of beautiful apples. Never did a meeting open more propitiously nor ever did one have a more enthusiastic attendance or a more earnest set of workers. Not a moment was lost during the whole of the meeting for every one was busy reading the papers or discussing the questions or listening to those who were doing so.

The following will give the work of the first evening:

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### EVENING PROGRAM.

Piano Solo.....Miss Anna Linderman, Carleton College  
Opening Prayer by Rev. S. W. Emory.  
Music—Piano Selection.....Miss Eisenberg

Address of welcome on part of city:

Hon. Geo. M. Wilson, Mayor.

Address of Welcome on Part of the Schools:

Rev. J. J. Martin, D. D., President of Carleton College

Response by Vice-President of the Society:

Mr. D. A. Robnett, Columbia, Mo.

Music: (a) A Jolly Coppersmith.

Chorus:—(b) Come Where the Lilies Bloom,

Misses Harlan, Blue, Eudie Wilson, Cooper.

Misses Nellie Conway, Virgilia Conway, Marks,

Messrs. Johnson, Harlan, Fleming, Forsyth.

Accompanist—Miss Eisenberg.

Birds (Illustrated).....O. Widman, Old Orchard, Mo.

Recitation—"New South".....G. M. Thompson

Paper—"Southeast Missouri for Fruits..M. Butterfield, Farmington

Pruning the Peach (Lantern Illustration) Prof. J. C. Whitten, Columbia

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### ADDRESS OF WELCOME.

By Hon. Geo. M. Wilson.

Members of the Missouri State Horticultural Society, Ladies and Gentlemen:

It is a pleasant duty to me, to welcome the members of this society to our little city and to surrender to them the keys thereto. This is the first time you have met in our city; and when I look over this large and intelligent audience and see the display of fruits and minerals, plants and flowers, I am proud I live in the imperial State of Missouri; I am proud I live in the southeastern part of the State; I am proud I live in St. Francois county; I am proud I live in the city of Farmington, and I surrender to you the keys of the city. Our homes are open to you. The best treatment we can give you, will be given you. I am not much acquainted with the science and practice of horticulture, but there is

no man, woman or child in the world who likes good things to eat better than I do. I know the people of Farmington are the same way; and we will feed you and do all we can to keep you from leaving us in a weak condition of body. Now I don't want the brethren to leave the city thinking the men have done everything towards entertaining them. There would have been very little done, if it had not been for the ladies, God bless them. Many of you have not been in this part of Missouri before. I think you will find we have the soil and climate here capable of raising all the products of horticulture produced in other parts of the State, though we have not raised enough for home consumption.

Our lead mines produce seventy per cent of the whole amount mined in the State. They bring about \$4,000,000 into the county each year. The men engaged in this business have to be fed. They are not food producers. They make a good home market for all our orchard and garden products.

No other county in the State has the prospects of St. Francois. Our census exceeds 24,000, railroads are intersecting our territory, our schools are among the best, men are seeking the advantage of residence in our midst. If any of you think you can better your condition by coming here to engage in your favorite pursuit, we will do the best we can to make you contented and prosperous. We want you to visit all our institutions, see our mines and industries, and hope you will always cherish in your memory a little green spot for the people of Farmington.

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#### ADDITIONAL WORDS OF WELCOME.

By Rev. Mr. Martin.

I think that by this time you all know you are more than welcome to our town, which has more pretty women and lovely men than any town in the State. We know there are some things here worth seeing.

We have, among many other things, a wagon factory which makes the best wagons on the market from timber grown right here. We are glad to have you know this is a town of schools. We have a number of well patronized schools: Among them are the Baptist College, Elmwood Seminary, and Carleton College. Our public school is among the best.

We have another attraction; we have here Mr. Butterfield. He is one of the most active, thorough going men I ever met. He will make this country blossom with fruit trees and roses.

A revolution is taking place. There was a time when work was not respected as it is now. A better day has come, when the educated man is not above working. It was a proud day in my life when a young man came to me and said, "I want to enter your school to prepare myself for a farmer." When young men mix brains and culture with the soil it will make every body rich any every body happy. Tickle the soil and it will laugh back at you with the harvest. The time was when men cared nothing for the soil, only to get from it all they could and to give nothing back. They scratched it like an old Shanghai rooster dragged backward by his tail. I have learned that this world is a very good world, the best I was ever in.

I wish more and more that I could make you feel more and more welcome. Everything in our town is yours. I would like to have you come and see me at Carleton College; but don't all come at once. When you go away from here, we want you to go away saying this is the best city in the world.

Again in behalf of our colleges and schools and every citizen, I extend to you a most hearty welcome.

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Response by Vice-President D. A. Robnett, Columbia.

Mr. Chairman, Ladies and Gentlemen:

In response to the address of welcome I, as the representative of the Missouri State Horticultural Society desire to thank you for the

warm and generous reception and welcome you have given us to your city and for the hospitality of your homes.

Your invitation has been of the kind that is worthy of appreciation and we have felt from the moment of our arrival that we were welcome.

We are glad to be here, and come to this city and county feeling that we are not altogether among strangers for there are those here who are much interested in our great work. From these friends we have had all assurance that we would receive a warm reception this we must say has been fulfilled in every particular.

We hope our coming here will be profitable both to you and to us and that we may help you build up a great fruit interest.

We feel that you have one of the finest fruit sections in our State and its location could not be surpassed. You are within a few hours of a great city where you can dispose of all kinds of perishable fruits to a great advantage over those who have to ship a great distance.

The success or failure of this meeting is largely in the hands of the citizens of Farmington and St. Francois county.

A few men can agitate a cause but it takes the masses to accomplish great things. To make your county a great fruit center will take hearty co-operation. I am glad to say that there is no profession where individuals can and do work together with such harmony and brotherly love as do horticulturists.

We want to invite you all to become members of our State Society and help to develop the fruit interests of this section of Missouri.

Our cause at this time needs careful considerations. The past few years have been so discouraging to us that many have lost interest in the work and some have felt like giving up all, but this none should do. For in horticulture as in all other pursuits there will come times of adversities. Remember that after long days of cloudy weather the sun shines brighter. Who knows but that all drawbacks to horticulture in the past three years may prove a blessing to those who hold out faithful.

If there were no cross there would be no crown. If we had no enemies, no bad seasons our fruits would be of no value.

If there were no mountains or cold regions to pass through between here and Alaska we would all have gold to spare.

Now that we have passed through so long a series of adversities let us look for greater prosperity in the coming years.

We have before us now two important occasions, first the Exposition at Buffalo in 1901. We are preparing to make a showing of our horticultural products there. Let each one of us feel that we are responsible for the success of that exhibit.

Then the World's Fair at St. Louis in 1903 comes. With this let us hope there may come a great fruit year that we may make the greatest show of our life. We would herald the fame of Missouri world wide. It is not too soon to begin to make plans for this occasion and to work to the end that will develop those plans.

In behalf of our noble society I shall again thank you for your hospitality and ask your presence at all our meetings and your hearty co-operation in our work.

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## FIRST SESSION,

### THE FEATHERED DENIZENS OF THE ORCHARD.

By Otto Widmann, Old Orchard.

It seems to me that every fruitgrower would like to know something about the birds which he sees in his orchard. I think it is human nature to be inquisitive. When we see beautiful flowers in a garden, we are not satisfied with admiring them, we also want to learn their names; when we go through the woods and see the many different kinds of trees, we take pleasure in knowing what they are; very few among us would be contented to know nothing more about them than that they are trees.

Why, then, should we not also wish to know what kinds of birds are on our trees?

Certainly everybody must have asked himself often what kind of a bird is this or that? I often see this little fellow, but can never learn its name. No one whom I asked could give me a name, of which he was sure it was the right one. It is a fact, that it is hard to find a man, even among those who have always lived in the country, who can correctly name more than a dozen birds.

It can, of course, not be expected that anyone who does not make it a special study should know all of the 300 different kinds of birds, which live in our State or visit it at different times of the year; but it would be very desirable that at least the common birds, say from fifty to 100, were more generally known. In Europe the country folks are much better acquainted with birds, plants, and natural objects generally, than here, but there is some reason for it. From immemorable times the knowledge has been handed down from parents to children; here it is different; we are all comparatively new-comers; our fathers could not learn from their fathers much about the things they saw in the fields and woods, because they did not know much themselves; everything was new to them; names had yet to be given, and having no books or teachers for these things, they had no means of learning them.

Our schools have now begun to teach natural history, and in years to come parents will be able, I hope, not only to call things by their right names, but also to tell their children enough about them to awaken interest and create a desire to learn still more by their own observation as well as by the aid of good books.

With better acquaintance there will inevitably come more love for the birds; bean-shooters will be thrown aside, and the boys will find no pleasure in killing birds, but so much more in their protection.

To awaken and cultivate more love for animated things will be of great benefit to coming generations; it will make farm-life more pleasurable for old and young, and thereby keep many who now find country life too monotonous, from flocking into the cities. One who finds pleasure in Nature is never alone, never feels lonely; wherever he looks he finds acquaintances, greets and is greeted by dear old friends. This cir-



cle of acquaintances is continually widening; he makes new friends every now and then, and such friendships last as long as he lives. If all the world should forsake him, he is never entirely forlorn, for his friends among the birds will speak to him in the same endearing tones as they always did and will return to him year after year with the same youthful cheerfulness as in the days of his boyhood; and while everything else may be changed by age and decay, the ever rejuvenating Nature will make him feel young and fresh with every return of spring time.

Life in the country can not be fully enjoyed without this friendship with Nature; it makes people happier and I might say more refined. The lower man stands in mental and moral development, the more far-fetched and dear-bought must be his enjoyments. Display of gorgeous splendor delights him and loud and stirring sounds charm him; alone with Nature he feels lonesome and deserted, because he has not the blessed gift or power to derive pleasure from objects immediately around him.

Among the most interesting of these objects are the birds, and it gives me pleasure to introduce some of them to you in the hope of awakening a lasting friendship. You might say that some of these friends harm you by uncalled-for visits to your fruit; but if you have a true regard for their friendship you will be forbearing with their little sins. If you see them steal a little of your fruit, you must always remember, that it is you, yourself, who made them thieves. Who was first in this country, you or the birds? Surely the birds. Who cut down the trees, shrubs and vines, on which they formerly found the supply of wild fruit, which they need for their well-being?

You tell us that fruit is good for the health; of course it is, and the birds know it, too. I am sure God who made the birds and makes the fruit grow, makes some of the fruit grow for the birds, and it would be base narrow-mindedness to begrudge them their insignificant portion.

At first let me present to you the birds which troop through our orchards at this time of the year, in winter. They are of the greatest benefit to the trees and should be well protected. Most of them are hardy birds, who can well take care of themselves, still they suffer sometimes when the snow is deep or still worse when freezing rain envelops

everything, high and low, with an impenetrable crust of ice. At such times they come to our doors and beg for food, and they should have it. A piece of bacon or a hambone hung up in a tree is thankfully accepted; and, if not too much trouble, crack some walnuts or hickorynuts and place them on a board, or in a shallow box, on a tree near the house, where you can watch it, and you will be richly rewarded for your pains. You will have as lively a set of boarders as you wish; they will come and go all day long, and, when the sun comes out warm, you will be astonished to hear their cheering whistle even in zero weather.

They spend the nights in holes in trees. Don't cut down all the old trees in your neighborhood, or if there are none left, hang up some boxes on poles or in trees. The birds will sleep in them in winter and some of them will be induced to stay and raise a brood and thus remain in your vicinity, which otherwise they would have to leave for want of a nesting site, if for no other reason.

Some have recommended the introduction of the European Titmouse, because it is an esteemed denizen of the Old World's orchards, ridding the trees of the eggs and larvae of noxious insects. The birds here shown will do the same thing for us, if we only let them do it; they are here and willing to do it; all we have to do is to see that their numbers do not continue to grow less and less, as they are doing now. With the cutting down of the timber we deprive them of their roosting and nesting opportunities and give them nothing in return.

The Downy, the smallest of the seven or eight different kinds of Woodpeckers in our State, is with us all the year round; he makes his nest in a hole, which he chisels out himself in the dry branch of a tree. All through fall and winter he roams about, inspecting all trees, high and low, picking up insects in all shapes of development, above and below the bark, wherever this is loose enough to be detached by the energetic strokes of his stout little bill. He does absolutely no damage in this search, as he attacks no part of a tree not infested by insects.

Some mistake him for another Woodpecker, called the Sapsucker, who taps the trees for their sap.

The Sapsucker or Yellow-bellied Woodpecker come to us from the North in fall; some spend the winter with us in Southern Missouri, but

most of them go farther south and pass through again in March and April on their way north.

The Sapsucker attacks many kinds of trees, also apple trees, but the only harm he does is in defacing the trees. He punctures the bark of pine trees sometimes so badly that they look honey combed; but even in such extreme cases the loss of sap is not appreciable. At least I have never seen that the ornamental evergreens so attacked, namely the Scotch and Austrain Pines, were in any degree less healthy than those never attacked, the White Pine and Norway Spruce, growing by their side. The young Sapsucker in its plain winter coat looks somewhat like the Downy, therefore the popular confusion, but the old bird in its spring dress is a beauty, and it would be a pity to kill him for his bad habit, especially since he does not live on sap alone, but also eats insects.

The Tufted Tit and the Chickadee are both permanent residents of our State, nesting in holes in trees and going together with the Downy and the Nuthatch in small troops foraging through the woods and orchards. While the Downy attends to the trunk and larger branches the Tit and Chickadee search the smaller and smallest twigs, where not even the most diminutive egg escapes their sharp eyes and pointed bills. Myriads of insects are thus destroyed in the egg form, which, if left to hatch, would do incalculable damage to vegetation. And besides this benefit, we also derive great pleasure from their company, they being jolly fellows, whom no amount of cold can rob of their good humor; they have always a cheering note for you, are never entirely silent except in murky, damp weather, which they seem to detest as much as man himself.

Birds have their likes and dislikes, their loves and hatreds, their pleasures and fears, their virtues and vices, very much like human beings, and there is no trait of character in man, which is not also found in birds. Man has always acknowledged this consciously and unconsciously, using the birds for symbols of human characteristics. The eagle we chose for a symbol of freedom, the dove for love and peace, the peacock for pride, the owl for wisdom; the barnyard rooster serves us as a token of victory and triumph, and to the angels we give wings, the symbol of security and shelter combined with loftiness of character and

purity of thought.

Another interesting visitant to our orchards is the Nuthatch; it also remains with us the whole year, but is much oftener seen in winter than in summer, when it retires to the woods, while in winter it roams with the Downy and the Titmice through our orchards and gardens, visiting in turn all trees in its domain. Woodpecker-fashion it crawls up the trunks and along the branches, but unlike all other birds it runs head foremost down the side of a tree with the same ease as up, and in alighting as well as before taking wing it assumes this unique attitude, head downward. Like its companions it is a great benefactor through its incessant war upon insects hidden in the cracks of the bark; for a change of diet serve him nuts, which he understands how to open after fastening them in a crevice of the bark.

The Brown Creeper is another member of this interesting band of marauders, who volunteer to rid our orchard trees of dormant insect life. It is one of the smallest of our birds and one of the most indefatigable hunters, all day long busy creeping up the trees, always beginning at the base, and ascending in a spiral around the trunk and its larger limbs, only to fly down to the next tree to begin again at the base. With its long and slender bill it can reach into the smallest fissures of the bark. Unfortunately this very useful bird does not stay with us the whole year; it breeds in the pine woods of the North and spends the winter in the South, but is common in migration in fall and spring and some remain all winter, especially in the southern part of our State.

The Kinglets, also small and with the exception of the Hummer the smallest of our birds, are not to be omitted, when we enumerate the members of the hunting party, which the orchardist is likely to meet now on his grounds. They are of two kinds: the Ruby-crowned and the Golden-crowned, the first more numerous in fall and spring, the other never so plentiful, but more hardy and oftener found in winter. They are both valuable allies in the battle against the insect plagues, and we only regret that their stay is not more prolonged in spring, when they hurry to their northern breeding grounds. The Ruby-crown is one of our sweetest songsters in early spring.

The Wrens are also to be counted when we speak of the useful

denizens of an orchard. Wrens are untiring collectors of entomological material, and being inquisitive and bold they investigate dark nooks and corners, not visited by any other bird.

The great Carolina Wren is a common and permanent resident south of the Missouri River, but becomes suddenly rare northward. It is a noisy bird, whose loud and pleasing voice is oftener heard in winter than that of any other bird, startling the wanderer in the woods by his sudden outburst of melody.

The Bewick's Wren may properly be called a summer sojourner in Missouri, but south of the Missouri river some of them remain over winter. It prefers hilly ground and frequents the farmyard, while the Carolina Wren is rather an inhabitant of the well-timbered bottom, but both visit the orchard and busy themselves mainly around the base of trees. The common House Wren, another species of this family, never winters in Missouri, but is the most abundant Wren in summer from St. Louis northward, while southward its place is generally taken by the Bewick's Wren. It earns its name by its great familiarity with man's abode. No bird exhibits more confidence in man's good will than this Wren, who places its nest under our very eyes, sometimes in the most extraordinary situations, the only precaution taken being security from the reach of the cat. All the Wrens are industrious songsters, and this House Wren is continually heard around the house from the day of its arrival in April till its departure in September. Living entirely on insects and rearing two and even three broods of six or seven young in a season, it must certainly be a most useful creature.

Among the birds which come from the North to spend the winter in Missouri there is none better known and more generally distributed than the Junco or Snowbird. It belongs to the Finch or Sparrow family spends, Sparrow-like, most of its time on the ground, scratching for insects and weedseeds. Arriving in October they scatter in troops over all cultivated land, are often seen in the Orchard, resort to the farmyard when snow covers the ground, but returns to the fields and woods as soon as thaw weather sets in.

The Cardinal Redbird, also called Kentucky Redbird, is another member of the Sparrow family found in the orchard summer and win-

ter. It is an exquisite singer, and his song is so much more appreciated because it is heard at times when few birds think of singing, in the earliest spring and even on sunny days in the depth of winter. His voice is so full of cheerfulness that it never fails to awaken pleasant thoughts of balmy spring days, dispells all gloom and discontent and helps to bridge the gap which yet separates us from the longed-for days of Nature's resurrection.

The Redbird needs a little corn to help him over the winter, but it is generally the stray kernals he finds in the cornfields, and he pays for it by the destruction of insects, which he scratches from under the leaves at the foot of the apple tree.

When the Redbird becomes emphatic in his announcement of approaching spring, then it will be time to look out for the appearance of the Bluebird, the first bird to return to its old haunts in the orchard and around the house, very few Bluebirds winter north of the Missouri River and those who remains in Southern Missouri resort to sheltered bottomland where they spend the long, cold nights in holes in trees and the days in search of food in favorite places.

Long before the reign of winter is drawing to an end this delicately colored but hardy bird feels the impulse of love, and we see the old mates, who faithfully keep each other company all the year round, visit their old haunts with a view of selecting quarters for the coming season. Cold weather may drive them again to their shelter in the bottom and may keep them there for weeks, but with the first return of thaw and warm sunshine they are back again to take possession of their chosen home.

The English Sparrow often takes his box and tries to keep him out, but there is a remedy for that; I place the Bluebird's box so low that one can reach it from a chair; no English Sparrow wants this box, it is not nearly safe enough for him, but the Bluebird is a more confiding creature, even likes such situations, and holds it against all intruders. Like the first flower in spring there is no bird more welcome than the Bluebird with its beautiful livery, confiding ways and charmingly soft voice.

Another and hardly less esteemed harbinger of spring is the Robin.

He enjoys the distinction of being the bird oftenest mentioned in poetry and prose, an honor which he partly owes to his namesake across the ocean, the favorite bird of Great Britian with which he has nothing in common but his red breast and his attachment to man. It has this ready responsiveness to friendly treatment which has won for him the deep place in the affection of the people. We can not help feeling kindly toward an animal who puts so much confidence in us that it makes the lawn in front of our house his play and feeding ground, and who puts its nest on the nearest tree to our window. Its song is so well suited for a herald of joyous times, and its manners and carriage are so manly and noble, that it is no wonder it is a favorite wherever it shows itself except in the strawberry bed and on the cherry tree. Fortunately there are many more Robins than strawberry beds and cherry trees and if you find it necessary to teach him a lesson once upon a while, I hope in course of time Robins will learn to keep away from strawberries and cherries as long as you are within sight. There is one bird which is worse after cherries than all the rest. For its fondness of the fruit it has among other names also received the name of Cherry bird. Where cedars grow abundantly people call him Cedar Bird, for it eats the berries with great relish. In the books we find him under the name of Waxwing, because he has for adornment appendages on his wing resembling red sealing wax. Well, these modest-looking birds, clad in a garment of delicate tints of brown and wine-color, have the bad habit of appearing on our early cherry trees in troops of twenty to forty and without uttering a single syllable of excuse go right to work tasting whatever shows signs of approaching ripeness. Like most other people they love the sweet varieties much better than the sour and if driven off return with great obstinacy, unless you spray the tree from time to time with a dose of fine bird shot. There is little danger of exterminating them; the negroes in the South who like to eat the plump little fellow, try it every winter and have not nearly succeeded yet. The bird has the good sense to disband as soon as the Cherry season is over and retiring into seclusion for a few weeks, generally succeeds in rearing a brood of three or four young ones. It is one of our most sociable birds, always, excepted when nesting, in troops roving over the country in search of

wild fruit, its principal food, though also destroying many insects, which it can catch on the wing as adroitly as a fly-catcher.

Another bird which likes fruit is the Mocking bird, but they do not come in bunches like the Cedar birds, and they pay for what they take with their exquisite song. In Northern Missouri Mocking birds are rather rare, it being the northern limit of their distribution; in Southern Missouri, too, they are nowhere so plentiful as to do appreciable damage to fruit, and I hope there is none among us who would kill a Mocking bird for stealing a few berries.

The Thrasher and the Catbird, next cousins of the Mocking bird, are also birds which should never be killed for their little sins in the orchard or vineyard. The Thrasher is one of our most melodious songsters, nearly as good as the Mocking bird himself, and the Catbird makes up in quantity what he lacks in quality of his music. He is also much more familiar than the Thrasher, comes under our window and builds its nest and raises its young so near our daily walks that we can not help taking interest in him and in his domestic affairs. Like the Wren, to which they are nearly related, the Thrasher and Catbird are insectivorous and therefore beneficial to husbandry. Fortunately they are both common throughout the State, wherever the land is tilled, preferring cultivated land for its abundance and variety of insect food.

The Thrasher returns to us from its winter quarters in the southern states pretty early, generally in the latter part of March. The Catbird comes nearly a month later, waiting until the bushes become green.

When the Catbird arrives our orchards are in their prime, decked with bloom and young green. At that time of transformation wonderful changes are taking place in Nature. New birds are seen and heard every day and our blooming trees are swarming with bird life. It is the gala time of the year, when the many different kinds of north-going warblers pass through our State, and when the brilliantly colored, sweet-voiced summer sojourners return to our fields, woods and orchards. Once being acquainted with them, how glad are we to welcome each one back after such a long separation. A whole long winter lies between our last meeting and this first welcome. How often did we think of them and how did we long for the time when we would see them again..



Now, all at once they are here: The wild call of the Baltimore Oriole is wandering from tree to tree and sometimes we catch a glimpse of its beautiful black and orange dress. Its cousin, the Orchard Oriole, pours out its voluble song going from branch to branch in search of the worm which infests the tree.

The Indigo bird, the Goldfinch with its black cap and wings, the entirely yellow Yellow Warbler, the Kingbird, the Redheaded Woodpecker, the Warbling Vireo, one of our sweetest vocalists in the orchard and on the shade trees around the house, all are here and have come to stay for the summer. What a medley of voices and what an exuberance of vitality in these little busy-bodies. But the loveliest of all the tenants of our apple trees is the Rose-breasted Grosbeak with its wonderfully melodious song.

From year to year more species, not known before in the orchard, accommodate themselves to the new condition of things, when timber grows less and less and apple orchards more and more, they lose some of their wildness and settle in our fruit and shade trees.

The Woodthrush, the renowned musician, formerly an exclusive woodland bird makes its nest now near our windows, so does the Flicker, the Woodpeewee, the great crested Flycatcher, the Cuckoo, and others. and if we would plant more shrubbery around our gardens and more hedges along our fences we would attract a number of birds from the woods and would do a good work by affording them the needed shelter, of which they become more and more deprived by the progress of civilization as expressed in the destruction of forests.

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## SOUTHEASTERN MISSOURI FOR FRUITS.

By M. Butterfield, Farmington, Mo.

There is probably no section of Missouri of which so little is known as to its resources and possibilities as Southeast Missouri. It

is true it has been known as a great iron producer because of the name of the Iron Mountain Railroad and its once famous mountain of iron; and has come into prominence of late years by the development of its wonderful lead deposits, now producing, I am credibly informed, one-fifth of all the lead in the United States. But farmers, fruit growers, stock men, tobacco raisers, etc., from the east never thought of coming South when they arrived at St. Louis. I am certain I did not when I crossed the Mississippi in 1869.

I have spent only a part of two summers in this section, and in treating of this subject will be compelled to confine my remarks and observations to a few counties, viz.: Ste Genevieve, Jefferson, Washington, St. Francois, Madison, Bollinger, and Wayne.

Here we find, not only iron, lead and other minerals without limit, granite, marble and lime stone with which to build up the cities on Missouri, but we find an ideal country for farming, stock raising, poultry farming, etc., and a country whose possibilities as a fruit growing section are not surpassed anywhere.

Its climate and plentifulness of living water make it peculiarly a desirable place for poultry farming; yet this industry is very much neglected. I was talking just the other day to a gentleman from Dent county, who is running five incubators and who now has 1,300 young chickens just hatched. He is quietly getting rich and that fast. He places his chickens on the market at about three months old and sells three crops a year.

But what I want to speak about is the Fruit Industry—not what it is to-day, but what it can be brought up to. Beginning with the Strawberry, I will say that with the little attention already paid to this favorite small fruit, the berries of this section have already gained a reputation in the St. Louis market for their superior quality and flavor, which entitles them to a special quotation in that market. You may ask why not in other markets. Simply because they are not raised in sufficient quantities to reach out to more distant markets. The past two seasons I find that our berries ripen from six to ten days earlier than those of St. Louis county, and further south they are still earlier. The yield is immense, little patches furnish high-colored berries of the

best quality. I found a small patch at Fredericktown, county seat of Madison county, twenty-feet wide by 150 feet long, which yielding about 382 gallons or about 15,000 quarts to the acre; I saw the ground and should not have selected it for a strawberry patch, there are thousands of acres that are better. Surely there is something in the soil to get such results. I could say as much for dewberries; they grow to perfection in the wild state; raspberries and blackberries do equally as well, and as for gooseberries, I have hardly ever seen them equalled; and yet we see merchants shipping gooseberries here from St. Louis by the barrel.

Just think of a country with all the elements in the soil to make this fruit to perfection, and then sending away to buy it. This will not be so long, I hope.

Passing on to cherries, I find the same favorable conditions, especially for such varieties as Early Richmond, Montmorency, and English Morello. The two former seem to do the best. There are also some old seedling cherries of the sweet varieties that do well. I will report more fully about them later on.

Of plums, the Wild Goose grows to immense size here, and the Blue Damson and German Prune do well in this sandy soil of St. Genevieve county. I did not see any Japan sorts in bearing this year.

Peaches grow wild here. Most of the trees look wild, any way; they are away up in the air, and if you wish to gather a few specimens you have either to chop down the tree or knock the fruit off with a pole. I learn that the peach has never been known to fail in certain locations in this section. There were quite a good many peaches here in the summer of 1899—after that cold, cruel winter. I find that what few peach trees there are here were generally loaded this summer, I wanted a few peach seed, and had some of the merchants to advertise for them. I succeeded in getting about 250 bushels. This would represent about eleven car load of peaches, so I am sure they have peaches in this locality. My opinion is, if you plant the peach tree on the higher elevation, you will be almost sure of a crop every year; and yet a gentleman told me that his peaches did best on the low bottom lands.

Really I think you can hardly make a mistake in planting peaches anywhere in Southeastern Missouri.

The apple does well here, although this was an off year, owing to the heavy crop of last season. Of course we have some soil here on which the trees do not succeed well; but in this respect this country does not differ from any other. From my observation, all over Missouri we find orchards planted on soils not adapted to this fruit, and from people who have such orchards you will hear that apple growing does not pay.

I am fully convinced that apple trees need to be planted in our best dry soils, either here or in other parts of the State. In the red soil here the apple succeeds well, the trees grow fast, bear young and live long. Almost within the hearing of my voice we can see apple trees from sixty to ninety years old. It is true the apple has its enemies, but so does everything else, and it needs attention; but it will come as near growing wild here as in any country I ever visited. I wish to state right here, that in my travels this fall I have noticed that the yellow apple is the freest from worms, scabs, etc. The early varieties do well, and if they were planted on a commercial scale I have no doubt there would be a fortune in them, and in the near future I hope to see car loads of them shipped out. The Red June, Yellow Transparent, Early Harvest, Benoni, and other sorts grow well, and are comparatively free from insects. I have noticed in the last four years that the demand far exceeds the supply. Of the winter sorts which seem to do best, I will mention the Ben Davis, Gano, Missouri Pippin, Minkler, Wine Sap and think the Ingram will be at home in this soil. Of late fall the Jonathan, Grimes Golden, and Rome Beauty do finely. There are also a lot of seedlings that are very promising, especially a variety called the Nixonite or Bain.

The pear deserves special mention here. In my opinion this is the easiest fruit to grow in this section—less work and more pay. Of course you must have the right varieties and I think the Keiffer is about right, at least until the others are more fully tested. I have come to the conclusion, after thirty years observation in the State, that the pear tree only needs cultivation while it is young—say two to

three years; then seed down to grass, or better plant strawberries after the second year; cultivate and never break up the ground again. You will get good returns from your strawberries for several years and you will not wait long for the Keiffer to bear—say three years. I saw several three year trees bearing one bushel and more per tree. At the rate I saw five and eight year trees bear this year, an acre of 200 trees would yield 1,000 bushels, and yet there are very few pears grown in this section. I have noted this part of the State more particularly from Victoria to Lutesville over the Belmont Branch, and from Bismarck to Piedmont, Wayne county on the main line. When we think of the long season to handle this fruit, and the demand there is for pears, it is a wonder there are not more pear orchards planted, I was talking to one merchant in Kansas City this fall, and he remarked that he would need for his trade fourteen car loads.

I want to call the attention of fruit growers again to the Summer Apple as a commercial enterprise. I have engaged in the nursery business for twenty years, and have grown millions of apple trees, but I have never yet sold a commercial orchard of summer apples; neither do I know of one. I have been asked repeatedly by wholesale dealers of fruit in Chicago and other places if I knew where they could buy early apples, and I have never been able to give them the desired information. Now, it seems to me that a fruit grower of this section could make a good thing of it if he should plant Yellow Transparent in forty to sixty acre orchards so as to ship out in car load lots. This variety always commands a good price in the market. Mr. Milt Doughty, an observant fruit grower, thinks this variety grows to perfection here, and it certainly does from the fine specimens he gave me this summer.

## PRUNING THE PEACH.

Prof. J. C. Whitten—Columbia, Mo.

He showed how the peach tree at the agricultural college grounds at Columbia were cut back after the severe winter two years ago. The peach is more severely pruned than any other fruit tree. It grows so rapidly that this severe pruning becomes necessary. If it is not pruned the sap tends towards the end of the branches and the tree becomes straggling and slender, unable to bear the weight of a full crop of fruit. The fruit is much more easily picked from a tree that has been kept cut back. The extent of the cutting back should depend somewhat upon the age of the tree, the quantity of fruit buds and the amount of the previous year's growth. Ordinarily one-third or one-half of the last year's growth should be cut away each spring. One year peach trees usually have a central stem with several side branches. When planted the central stem should be cut off at the height the head of the tree is wanted; and low heads are now wanted by the best growers, about eighteen inches, or even closer to the ground. In general the trees pruned back severely or with medium severity, after the cold winter did the best. The buds were much weakened by the hard freezing and the strength of the root system was not enough to sustain so many weak buds. When the number of buds was greatly lessened by severe cutting back the vitality of the roots was sufficient to force a strong growth of young wood; many trees made new branches six and even eight feet in length the first season. Some trees cut back to wood more than four years old failed to grow at all, or even to send up a sprout. The bark and wood had become too hard for the formation of new buds.

[As the room was darkened the reporter could not take notes, but the slides showed plainly the manner of cutting back and pruning the peach as recommended by Prof. Whitten.]

## SECOND SESSION.—Wednesday, December 5, 9 a. m.

The following Committees were appointed:

*Finance*—G. T. Tippin, J. C. Evans, T. R. Peyton.

*Fruits*—W. G. Gano, F. Holsinger, E. J. Baxter.

*Flowers*—H. C. Irish, Mrs. A. Z. Moore, Mrs. W. T. Flournoy.

*Final Resolutions*—J. C. Whitten, E. A. Reihl, W. R. Wilkinson.

The greeting of delegates was a happy meeting. There were the following delegates properly accredited: E. A. Reihl, of Alton, Ill., from the Illinois State Society; A. F. Collman, of Corning, Iowa, from the Iowa State Society; D. Shank, of Clayton, Ill., from the Mississippi Valley Apple Growers Association. Besides these there were present Major F. Holsinger, Rosedale, Kansas, treasurer of the Kansas State Society; A. Chandler, of Argentine, Kansas, secretary of the Missouri Valley Horticultural Society. J. W. Stanton, Richview, Illinois; W. S. Perrine, Centralia, Illinois; T. H. Jones, of Chicago, Illinois; W. C. Reed and R. A. Simpson, of Vincennes, Indiana; D. S. Helvern, of Arkansas, and representatives from Shaw School of Botany. The Department of Agriculture, The State University and Agricultural College of Missouri, and the new Experiment Station of South Missouri.

The following Horticultural Papers had representatives or the editors themselves were present: Colman's Rural World, The Southwest, The Western Fruit Grower, American Fruit and Vegetable Journal.

The following letters were read:

Princeton, Ill., November 30, 1900.

L. A. Goodman, Secretary Missouri State Horticultural Society, Kansas City, Mo.:

Dear Sir:—

I do not think I have yet advised you that Mr. E. A. Reihl, of Alton, Illinois, will be our delegate to your annual meeting December 4 to 6, 1900. I trust you will have a large and profitable meeting.

Yours truly,

L. R. BRYANT, Secretary.

Osage, Iowa, November 1, 1900.

Secretary of the Missouri State Horticultural Society:

My Dear Sir:—

The bearer, Hon. A. F. Collman, of Corning, Iowa, is the regularly appointed delegate to represent this society at your next annual meeting.

Yours truly,

CHARLES F. GARDNER, Pres.

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Quincy, Ill., December 1, 1900.

To the President and Secretary of the Missouri State Horticultural Association:

Dear Sirs:—

This will be handed to you by Mr. Daniel Shank of Clayton, Adams county, Illinois. He has been closely identified with all the interests of our society since its organization, and has been helpful in a hundred ways of promoting the best interests of the orchardists in this vicinity.

As he attends your meeting for the best of purposes, in behalf of our organization, I take pleasure in cordially commending him to your fullest esteem and confidence.

Yours truly,

JAMES HANDLY, Secretary.

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Los Angeles, Cal., November 29, 1900.

Mr. L. A. Goodman, Farmington, Mo.

Dear Sir:—

Mrs. Murray and I regret to say to you and our Horticultural friends that we can not cut loose from this interesting country in time to attend the annual meeting of our State Horticultural Society so soon to convene in Farmington, in the land of the big red apple. But while we shall be absent in body, we can assure you and all our fellow members that we are present with you in spirit, and our wish is that you may have a grand good meeting and one that will do much to enthuse the fruit growers to greater efforts than ever before in developing the fruit industry of Missouri, the grandest and best State in the American Union, California not excepted.

Our trip has been one of great pleasure. To pass over the beautiful and fertile homes of eastern Nebraska, with vast herds of fat cattle



and hogs, fields of golden corn and others with a rich green carpet of wheat; splendid farm houses, beautiful villages and great cities with all modern improvements. Then from this over the less fertile lands of Western Nebraska and Colorado, with here and there the hut of a lonely rancher. Then on and up over the grand and magnificent Rocky Mountain range, with many peaks crowned with perpetual snow, and awful canyons, with vast areas covered with a growth of evergreens (many of them Colorado flowering spruce of great beauty). Then out over the vast deserts of Utah and Nevada, and up over the Grand Sierra Nevada range, covered with spruce and pine bending beneath a heavy fleece of newly fallen snow one to five feet deep. Then on out to San Francisco. Standing on the porch of the Cliff house on the coast looking out over the broad Pacific, are all things that must be seen to be fully realized. And when once seen can never be forgotten, but will be remembered with a feeling of awe and reverence for the Creator of this vast and incomprehensible universe.

We find that fruit trees in the valleys of Colorado, although well cared for and irrigated, only make about one-half as much growth as in Missouri, which we attribute to the altitude and cool nights. The codling moth gets in her work here just the same as in Missouri.

We spent two days at Grand Junction, the fruit center of Colorado. In reply to our inquiry of a wholesale fruit man as to how much fruit Grand Junction shipped out this season, we were told three hundred car loads. We then inquired how much nursery stock they were using and was told a large amount some seasons; as much as one hundred car loads. Later, we had an interview with the railroad agent and was told that this year they had shipped out seventy-five car loads of peaches and thirty car loads of apples, and that there had not been a car load of trees delivered at any one time in the last three years.

As a rule their fruit and vegetables sell in their local markets at fifty per cent higher price than in Missouri. And up to the capacity of their own markets to consume their products, they may make it pay fairly well, but when they send it into distant markets to compete with fruit grown in more favored localities on cheaper land without irrigation, we can't see how they can make it pay.

The fruit for sale by retail here in California is inferior to the California fruit in our eastern market, which the growers here account for by saying they always ship the very best to distant markets. We think our Missouri growers might profit greatly by their example.

Judging from the surface appearance of vast desert regions we have passed over, it seems to us that the Creator must certainly have designed it to simply fill up space and hold the rest of creation together.

We presume we are yet to see the best of California, and hope to get our report of our tour in proper form for our next annual report.

Again wishing you all a very profitable and enjoyable meeting,  
I am,

Yours truly,  
N. F. MURRAY.

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Washington, D. C., November 30, 1900.

Mr. L. A. Goodman, Secretary Missouri State Horticultural Society,  
4000 Warwick Boulevard, Kansas City, Mo.

My Dear Sir:—

The next biennial meeting of the American Pomological Society will be held during the autumn of 1901. While the exact time and place have not yet been decided, it will probably be held late in August or early in September at Niagara Falls or Buffalo, New York. It is expected that both these points will soon be decided by the Executive Committee and duly announced through the press.

As low transportation rates are assured by reason of the Pan-American Exposition at Buffalo it is expected that the attendance will be large and representative of the horticulture of the country. It is desired by the officers and Executive Committee that the sessions shall be truly national in character and that all sections of the country shall be represented both by delegates and speakers upon the program.

It is therefore suggested that your Society consider the matter of appointing delegates at your coming annual meeting and arrange to have as large a representation as possible in attendance. If there are questions of special interest to the horticulturists of your State that should be discussed at the coming meeting the Executive committee will appreciate suggestions from your Society regarding them at an early date, and will consider them in arranging the program. Horticulturists everywhere are benefitted by the closer acquaintance and union which such meetings as this make possible, and it is believed that great good will result therefrom.

It is also suggested that your members prepare to exhibit their new fruits of special merit at the meeting, as the biennial award of Wilder medals by the Society will occur at that time. In case the session shall be held at Buffalo the fruit exhibit will probably be held in connection with the horticultural display at the Exposition thus affording an exceptional opportunity to exhibitors.

I will appreciate the favor if you will advise me at an early date of such action as your Society may take in the matter as the program of the meeting is being made up for announcement in the near future.

Very truly,  
WM. A. TAYLOR, Secretary.

St. Louis, Mo., December 3, 1900.

Mr. L. A. Goodman, Farmington, Mo.

Dear Sir:—

I deeply regret my inability to be present at the meeting, but the Dairy meeting follows the Horticultural meeting so soon that it is almost impossible for me to be out of the office, as at the time of the Dairy meeting, I will have to be in Kansas City the most of the week and must get office matters so I can leave then. I deeply regret the fact. The Rural World sends greeting and hopes this meeting will be the most profitable and successful one in the history of the Horticultural Society.

Governor Colman says, "send my regrets, and say that only the most urgent business which calls me to Chicago at this time prevents me from being at the meeting."

Yours for a grand meeting,  
LEVI CHUBBUCK, Editor.

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Discussion of letters.

A. Nelson.—If the fruit growers, buyers and packers, of our State would heed what Mr. Murray says in that letter about sending nothing to market but first-class fruit, well handled, well assorted and well packed, it would be a great point gained. Our markets are depressed by inferior fruit. It is all wrong. Send your fine fruit to market, use up your culls at home.

J. W. Stanton, Illinois.—We are trying to impress our people with that very fact. The markets themselves are impressing the fact upon the people. The people seem to forget from one year to the next. The market may this year be broken down with large shipments of poor fruit, badly distributed, so that in many cases the returns are nothing, but next year the same thing will occur again.

Mr. Baxter, Illinois.—I think shippers' associations can do a great deal to help this bad state of affairs. It is hard to keep the grower from packing everything. I believe we can get around the difficulty only by association. Have everything inspected and all inferior fruit rejected.

## NURSERY WORK.

By S. R. Hammond, Olden, Mo.

While my entire time has been taken up with nursery work for the past six years, yet I know of nothing materially new to present to you.

## PROPAGATION OF PEACH TREES.

We select home grown seedling pits when they are available, and bed them out early in December or just before winter begins, leaving the seed about two inches deep. During the winter they freeze and the pit will burst or crack so the little tender sprout or plumule can come through readily. When the stocks are two to four inches high we transplant them in rows, planting them four to six inches apart.

Ground on which to grow peach trees should not be too rich and should be plowed as deep as three horses can turn it, then harrowed until all clods are thoroughly pulverized. Rows are marked off with a calf tongue plow, and four feet apart.

We prefer transplanting from beds because we can get a more even stand than if we planted the seed in rows in the fall.

The best peach trees for packing and shipping are grown thick in the rows; they are not so stalky, neither are the limbs (which always have to be cut off when planted in the orchard) so large; thus you see there is a good deal of expense saved both in packing and in freight bills. Most of the nurserymen who deal with commercial planters, charge extra for boxing and the purchaser has the freight to pay also, hence the demand for lighter grade peach trees, as they seem to do as well when transplanted to the orchard as the extra heavy grade.

Our peach seedlings are kept thoroughly cultivated until budding season, which is generally in August or September.

Now comes the most essential part of growing peach trees, viz., budding and selection of buds for propagation; we select well matured buds from trees that we know to be pure; the leaves are then cut off, leaving short stems with which to insert the bud in the stock: Keep the buds wrapped in damp cloth until we are ready to put them in. They can be taken off the stock, by either cutting them out with a very little

wood, or by cutting well into the wood and then cutting the bark, only, across the stick and lifting the bud from the wood; the latter method has proven the most successful here with us, because it gives us more bark surface to withstand the drouth that we sometimes have during the latter part of August and the first of September.

To insert the bud in seedling stock, cut the bark one and one-half inches up the tree from near the ground; then cut across and start the bud in, pushing it down with your thumb until it is at the bottom of the first cut; a boy then comes along with some raffia and ties it, wrapping the string around the tree six times, three above and three below the bud. Raffia is better than ordinary wrapping twine because it covers a wider surface and does not cut into the bark when trees begin to swell; these strings are cut and taken off as soon as the bud is well stuck, and in this condition they stay through the winter. As soon as the buds begin to start in the spring, we cut the tops of the seedlings off just above the bud and keep all seedling sprouts pulled off. The trees are well cultivated through the summer and in July we trim up the trees to desired height, the cuts resulting from same will heal over by the time the trees are matured and we have not only well headed but well shaped trees.

When I first took charge of the Nursery business here, we headed our peach trees by rubbing the tender limbs and leaves off, when the trees were from eighteen inches to two feet high, but in doing this we stripped the bark down on some of them thus checking the flow of sap and growth and when they started again the main stem seldom grew any higher, but a large limb would protrude out and grow up four or five feet, which made trees that were not only ill-shaped but unsalable. This set me to thinking, so the next year I left ten rows until July and cut the limbs off with a knife; when delivery time came I found I had ten rows of very fine trees with good heads. Hence my reason for leaving the heading of peach trees until July, or rather until the trees have well shaped tops.

## PROPAGATION OF APPLE TREES.

We propagate apple trees by grafting on piece roots; our seedlings are bought from nurserymen who make a specialty of growing them, and in February we do our grafting, taking scions from bearing trees; grafts are made eight inches long, the scion five inches, and piece roots three inches long. Both scion and roots are sloped about one inch, and split enough to allow the bark or surface of root and scion to come together perfectly even when the union is made.

When we are doing this work we request our men to force the scion and root together until the union is perfectly tight, then the graft will stand handling two or three times (which is always the case) before the boy gets it wrapped. For this wrapping we use waxed No. 10 wrapping thread, winding it around the union six to eight times. Grafts are then tied up in bundles of fifty and packed in damp coarse saw-dust. Some nurserymen use moss but the saw-dust will give better results, as it does not dry out so quick. As soon as the grafts are thoroughly calloused they are ready to plant, and should be planted as soon as the ground will do in the spring. Soil for grafts should be plowed as deep as possible, and all clods thoroughly pulverized. Rich upland preferred. Rows should not be less than four feet apart and furrowed out with a long calf-tongue plow; grafts can then be planted by taking hold of the union with thumb and two fingers, grip firmly and push down in center of the furrow, the dirt is then pressed around the union and furrow filled up until one bud only, is left uncovered.

We usually have two men to do this work, one sticks the grafts carrying a bunch of fifty in one hand and sticking them with the other; the second man follows, pressing the dirt around the union, and filling up the furrow. This is the most economical way to plant, we have ever tried, besides it saves dropping them along the row for the sun and wind to dry out.

Our grafts are well cultivated until August, no grass or weeds being allowed to grow around them. When they are one year old and just as soon as the leaves begin to start, we head the trees by rubbing all the leaves off from the desired height to the ground.

This part of the work is another very important part to the orchardist, because if an apple tree is headed too high in the nursery, it will be too high in the orchard. We try to head ours so that when they are matured at two years of age, it will be from eighteen inches to two feet between the ground and first limb, and I believe that is the height the leaders of our State Horticultural Society think is best.

After the one year trees are headed all they need is plenty of early summer cultivation; but care should be taken not to cultivate so late as to not allow the trees to mature in time for winter.

#### PEAR TREES.

Pear trees can be propagated successfully by grafting on Japan stocks, use strong branch roots and cut them back enough to plant conveniently.

Our best stands of cherry trees are budded on Mahaleb stock. Plum trees can be budded or grafted either successfully on Marianna stock. To get these, we take Marianna cuttings six to eight inches long, tie them up in bundles and pack away like grafts as soon as they are well calloused, they are put in rows in damp soil. By August they are ready to bud, or can be taken up and grafted the following February.

In conclusion I will say that one of the most important parts of propagating trees for the orchard is thorough cultivation.

If they are kept growing until the proper time comes for them to be transplanted, they are vigorous, and if a tree is strong and vigorous when it leaves the nursery, it should do well in the orchard.

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#### Discussion.

Secretary Goodman showed samples of trees with large knots or clubs upon their roots, and said, "we have lost hundreds of trees in the same manner. These knots will come back when closely pared off with the knife. I want the Society to discuss how to treat such nursery trees. Shall we plant them or throw them away? These trees were in a lot of stock bought for first-class. They were grown in Southern Missouri. The question is how to get choice apple trees and other stock. I think that care in propagation to have scion and root the same size would

prevent some of it.

Mr. Gano.—Do you find such specimens in limestone soil?

Mr. Goodman.—Yes; trees grown in limestone soil have the same knots on them.

Sam. Miller.—Can such a thing occur with a sound healthy root and a good scion? I think much of the trouble comes from bad seedling trees. I raise my own seedlings.

A. Nelson.—Last spring (1900) I started to prepare a piece of ground to be planted to trees next year. I think much of this trouble originates in the ground. I think we ought to select strong vigorous roots and the best trees from which to cut scions. These are points well worth considering. True, not only in apples, but it is also the way I want my peach trees propagated.

I put about twenty-five bushels of slacked lime to the acre on this land which I am preparing to plant next year. I will plant that ground to nursery stock next year, and I believe I have got the upper hand of wooly aphids. I think there are more losses of trees by deep planting than any other one thing that occurs in this country.

Mr. Atwood.—This is a very important matter. I call upon Mr. Helvern, of Mammoth Springs, Arkansas, who brought some trees to the Clinton meeting of this Society some ten years ago.

Mr. Helvern.—In 1889 Mr. Simpson showed some dead apple trees at Clinton. The 1,000 trees he had planted seemed to be the cleaning up of an old nursery, from three to five years old. Some of them bore a few small, knotty apples the year they were planted. He asked me to come and see his orchard. Many of the trees looked sick and were going to die. I did not then know anything of the wooly aphids. We pulled up one. It came easily. It had scarcely any roots and was alive with wooly aphids. The trees had been planted without care, the roots crammed into a small hole. The new roots had knots on them. He wrote to Washington, and other places, about them, but got little satisfaction.

Afterwards we took up more trees. The knots were larger. We made a thorough examination and decided that the trees were dying of the aphids. Later on, in October, we found many of the trees in a man-



ner dead. The knots were larger and more numerous.

Secretary Goodman.—This is all off the subject. The subject under discussion is how to grow choice nursery stock.

Mr. Tippin.—This is a very important subject. Mr. Helvern was after rabbits when this thing we are after is bear. The question is whether these root galls are caused by the character of the propagation or the conditions of the soil. Is there any difference in the southern and northern parts of the State?

K. B. Wilkerson (Audrain county).—We have lots of it in our nursery.

Mr. Tippin.—This thing is spreading. Trees have been suffering with root cancer for several years. Many are wholly worthless because of root knot. I hardly ever see it only on one year trees. Now and then it shows upon two year trees. If it comes from importation of stock, this is what we want to know. If we can improve upon growing trees we want to do it. Has any one tried the propagation of trees from root cuttings alone? I tried it one year, using strong roots from two year trees. I grew some good trees but the per cent was too small. I will try it again, under glass. It will make trees on their own roots, alike top and root. If I can get from seventy-five to ninety per cent to grow it will be a success.

J. C. Whitten.—Prof. Toumey of the Arizona Experiment Station has issued a bulletin upon the root gall. He finds it is caused by a slime mould which exists in the soil. It may attack trees free from wounds of grafting or other cause. Copper sulphate goes a long way to prevent it. Knots were cut from trees with a hatchet and the wounds painted with a mixture of copper sulphate and lime. They did not grow again. Several years ago I planted affected trees in a corner. Seedlings and other trees planted near these affected trees developed the same galls. Apple seeds produce trees affected by the same fungus. It is evident that slime mold may cause this root gall in trees not grafted. Bad grafting may make it worse. As to how much good methods of propagation may do to prevent it I don't know.

D. A. Robnett.—I am not a nurseryman. I am a fruit grower. We want to know how and where to get healthy trees.

## VALUE OF COOL STORAGE FOR NURSERY STOCK.

By R. J. Bagby, New Haven, Mo.

Frost proof cool storage has become a business necessity. The time was when the Nurserymen could assure his southern customers that stock would be dormant when shipped, and that his order could not be dug in January, or February and often not in March. The business is now along different lines. Many large growers of nursery stock cellar for winter and early spring shipments, all their needs for this trade.

Trees can be corded or ricked with the minimum of moisture with perfect safety. The practice, generally, is to dig late in November while conditions are favorable, and get the stock in cellars, and then grade out ready for shipment. The cellars, so called, are usually frost proof buildings, mostly above the ground. Small fruit plants need more light and a better circulation of air than fruit trees, but if properly kept with the minimum of moisture, will look as bright and fresh in spring as when stored. Trees that had been cellared in the winter of 1899 and 1900 as compared with early dug spring stock, started off earlier and with more vigor when transplanted. We believe it is only a matter of time when practically all of the trees used in the spring business will be stored by nurserymen in the early winter. The loss of stock in the winter of 1899 taught a lesson that will result to the benefit of all concerned.

To demonstrate more fully, that stock does not loose its vitality, when stored, it may be of interest to state as a matter of fact that imported stock from France, shipped in December, arriving here in January is transplanted successfully year after year; this stock is dug in France in November and cellared for grading, which is usually done in December. Stock is enroute several weeks, and is then cellared here until the planting season opens, and is often left in the original cases. If not packed too damp, they will invariably come out in perfect condition,—some planters might say rather dry, but we have unpacked pear seedlings in March that were very much shriveled and yet 95 per cent would live and make very satisfactory growth. The average planter

wants to see everything wet, and if the roots of the trees on his shipment are not wet, they are often pronounced "as dry as a bone, and dead." We incidentally mention this fact as it may have no connection with winter storage. It may be of interest to state the fact that shipments of some nurserymen are as large in December and January as in any months of the year; this business could not be taken care of, except with cellared stock.

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### BEST CROPS TO BE GROWN IN AN ORCHARD.

By W. R. Wilkinson, St. Louis, Mo.

I have been requested by the Secretary of this Society to give my views as to the best crops to be grown on an orchard.

All of you will likely agree with me that a crop of Big Red Apples should be of first importance and all other crops should be of a secondary consideration. I consider that an annual crop of hogs should be of next importance together with such grain and forage crops as will produce food for both hogs and land.

My first planting of apple trees was made in 1878 and includes 900 trees, situated on the bluffs overlooking the Mississippi river in Perry county, Missouri. Owing to the extreme inclemencies of the weather, this orchard has, since in bearing, produced only three full crops. I have kept record of receipts and expenditures for one year only, 1899, when this block of trees netted me \$108.75 per acre for one year's crop.

In February, 1893, I was called to New Orleans to look after my milling interests and my attention was called to the price of both flour and apples in that market, best patent flour was selling for \$3.50 per barrel, and Missouri apples were selling in car load lots, for \$6 per barrel, and to-day the price of apples is fully as high as flour in that same market.

On my return home from New Orleans I bought more land adjoin-

ing my orchard, cleared same and planted 100 acres to apples and continued my planting until now I have an orchard of almost 27,000 trees, a large portion just coming into bearing.

Now as to the crop of most importance, Red apples, would suggest that after orchard is in bearing, that such crops be grown as will permit continual cultivation after beginning of the drouth season, which in this section is from 15th of July to 15th of September. I do not favor early cultivation as most growers do, as the cultivation has too much stimulating effect causing too much growth, prevents fertilization of fruit, also causes fruit to drop prematurely. After July 1st, land should be thoroughly plowed, followed by frequent shallow cultivations after each rain or at intervals of ten days. No crop grown on the farm shows good effect of cultivation more than fruit trees and no good fruit can be expected without thorough tillage.

For young trees it is essential that cultivation begin early in the spring and be continued during the whole season from April to September.

Such seasons as trees fail to bear I would advise cropping to cow peas or other leguminous crops to add needed fertility to the soil.

Now as to the second money crop, hogs I consider a most valuable adjunct to fruit growing, as they destroy all fallen fruit during the season, together with all insects and noxious and injurious weeds. Since I have bred and raised hogs in connection with apples, I have dispensed with the spraying machines. I have not entirely eradicated the insect pests, but my orchard is freerer from these pests than others who do not raise hogs; in fact for the last few years I have sold all my cull apples to farmers having orchards, living within a radius of twenty miles; they not raising enough to supply themselves with fruit for apple butter and for family use. I attribute the failure on their part to lack of cultivation at the proper time and no attention paid to exterminating insect pests. People in Perry county, who suggested that I was a fit subject for the lunatic asylum, for planting so many fruit trees, are now paying me \$1 per barrel measure for cull apples and hauling them for many miles to their homes.

Now as to crops that are beneficial to both hogs and land. We

should have crops that will give us a rotation of feeds from early spring until winter. I have my orchard divided into lots or plats containing twenty to thirty acres each. I have two of these plats sown to Red Clover that gives us very early green feed lasting until mid summer, and with but little grain food will put hogs in good growing condition and add humus and fertility to the soil. I would not advise growing this crop on same land longer than two years in succession as it causes the tree roots to grow too near the surface and prevents needed cultivation.

The second crop I am now growing in my rotation is Dwarf Essex Rape, this should be sown as soon as the land can be tilled in the spring. If broadcasted, four or five pounds should be sown to the acre, or it can be drilled in rows and cultivated; this will produce more green feed to the acre than any crop I know of, and hogs do better on it than clover. It grows very rapidly, and luxuriantly, it will be ready for pasture in two months after seeding. The seed costs about ten cents per pound retail; this crop will be generally grown for hogs and sheep when its merits are more universally known. It could be grown either in the spring or fall and stands as much cold weather as turnips; being a biennial plant, it does not go to seed until the second year, I have never raised any seed from this plant, as seed men all use seed imported from England. This crop should be grown on good land, as it does not add any fertility to the soil, but if hogged off it should not rob the soil of any, as it is added in a more available form of food.

The third crop in the rotation is winter barley, this is the first grain crop and should be sown in this section about September 15 and ripens about June 10. Hogs are turned into this when ripe and do their own harvesting as they do all the other crops I grow; and have access to the clover, fallen apples and barley at the same time. After grain is all eaten this land can be plowed and cultivated for the balance of the season if it is bearing trees.

The fourth and last crop in the rotation is cow peas. I sow New Era for early pasture and Red Ripper for general crop; the New Era is a small blue pea growing upon a stalk that vines but little and it is the earliest known variety, it will mature in sixty to ninety days.

I plant this variety in May so as to mature and be ready for pasture after the Barley; it produces fifteen to twenty bushels of peas to the acre and is worth as much to hogs as an equal amount of corn.

For general crop the Red Ripper cow pea is superior to all other varieties, it produces about same amount of vine as Whippoorwill and is equally as productive in peas and will not rot during wet or cold weather. These peas will go through the winter and be perfectly sound in the spring; this crop will add more plant food or fertility to the soil than any other crop known, it collects the nitrogen from the air and stores it up as available plant food in the soil; this crop alone is worth more to the farmer than \$15 will buy in commercial fertilizer, it will prevent land from washing and is the most valuable crop a farmer can grow. The New Era will mature in any portion of Missouri. Hogs can be matured and fattened on this crop any time after ripe, my foreman has shipped eighty head of hogs this fall and twenty-eight ready to ship in a few days, and about same number to carry over the winter; all these were fed and fattened without corn; they were grown in the orchard and have eaten such crops as I have above described and harvested all the crops themselves.

My apple crop this year was almost a failure owing to the Bitter Rot, I had promise of a very large crop up to about the first of August when Bitter Rot first appeared and almost completely destroyed the whole crop; one reason the past summer was a remarkable one is that it rained almost daily from June 15 to August 15 causing Bitter Rot and other fungous diseases to be worse than ever known. The few perfect apples, the culls sold to farmers, and proceeds from hogs, more than paid expenses this year, and I have promise of a large crop of all next year. I am more enthusiastic of success than ever before and believe fruit and hogs will pay the farmer better returns than grain or most other specialties.

## DISCUSSION.

J. C. Whitten.—I think the paper was a good one. Rotation of crops in the orchard is a good idea. I am very much interested myself. I would like to hear from a man who has grown some crops in his orchard.

Mr. Baxter.—On a small place where you have a market, I believe strawberries are a good crop to grow in the young orchard. I have grown a fine crop of strawberries in a young orchard for four years, 1896, 1897, 1898 and 1899, and have replanted them this year, 1900. I made \$50 per acre clear profit for each year. It was sub-soiled fifteen inches deep when planted. I will grow two more crops. The trees are very nice, never saw better. These trees are large enough to bear half a barrel of apples next year. They have been sprayed with Bordeaux mixture every year to retain the foliage.

Mr. Wilkinson.—I agree with the gentleman as to a young orchard, but what when the trees are older and too large for a strawberry crop? In young orchards I drill cow peas so I can cultivate both peas and trees. In old orchard I sow them broadcast. I have one plat seeded to barley in the thirteen-year-old-section of my orchard. The barley comes off, or is ripe about June 10. After that I plow and cultivate.

Mr. Collman, Iowa.—I have an orchard of forty acres, eight acres fenced. The gentleman is a strong believer in hogs, so many as to prevent weeds. I don't think very much of hogs in the orchard. They pack the ground in a few years so hard that the orchard declines and dies. With their small feet they pack the ground harder than larger stock do.

Mr. Jones, Chicago.—In our orchards in Illinois and Kansas we found we could not grow apples and hogs in the same orchard. They would root and make wallows, rub and break the trees. Some hogs would pull down the lower limbs of the trees and get many apples. Before we put hogs in the orchard we could gather half the apples standing on the ground. It don't take very many hogs to do me in an orchard. We have paid boys to gather up the apples and feed them to the hogs. Kaiffer corn we found very profitable in our Kansas orchards.

The seed pays the expenses of growing the orchard. It does not seem to grow everywhere. Cow peas seem to grow almost everywhere and I think they are wonderfully adapted to the orchard.

J. C. Evans.—I think Mr. Wilkinson's paper a good one, but letting the crop grow till the first of July would make my orchard very foul. We cultivate early and sow the peas sometimes in May.

Mr. Wilkinson.—We have to have a rotation and succession of crops for the benefit of the hogs. Barley ripens about June 10, and when it is eaten by the hogs, you can cultivate and sow a late crop of peas. When in clover you don't cultivate at all.

Mr. Collman.—I don't believe in pasturing my orchard. I have tried a new plan, turning my hogs in the orchard in the forenoon, letting them stay long enough to gather the fallen fruit, and then keeping them out till the next morning. I don't think they injure the trees when managed in this way.

Secretary Goodman.—We adopt a variety of ways to suit our conditions. For two or three years we grow corn, and then cow peas; sometimes rye cut down, or left to fall down, sometimes hogs, clover two years. Large plats sometimes lie idle. In the fall we plow and continue it all the winter when the soil and weather permits. I would like to put some winter crop in the orchard, but we can not plow it all in time, so use a variety of plans to get over as much ground as possible with the same teams.

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## PRUNING.

By G. P. Turner, Meadville, Mo.

Shall we prune? If this question was put to a vote of the tree-planters of the State of Missouri there is no doubt but that quite a number would register a vote in the negative. Some who have seen the disastrous effects of over-pruning jump at once to the other extreme and condemn the whole practice of pruning. Why do we prune? For



various reasons. We prune to promote growth, and we prune to check growth; we prune to promote fruitfulness and we prune to diminish fruitfulness; we prune when the tree is dormant and we prune when it is in full leaf; we prune both roots and branches; we prune to change the form of a tree and we prune to change the growth from a vigorous part to a weaker part of the tree. There are other reasons why we prune, but I need not speak of them now. I will try now to exemplify or illustrate each one of these cases of pruning. Beginning with the young tree in the nursery one or two years of age we observe that as a rule the most active growth is from the extremity of the trunk, or in other words from the terminal bud, and with many varieties if there is no interference by pruning the tree grows tall and slender with few side branches. But if the tree is "headed back," that is, the trunk cut off at the point where we wish the tree to head, what is the result? The sap obstructed from its natural flow seeks new channels. The side buds that before were weak and dormant now send out vigorous shoots with healthy well formed leaves which are much more capable of elaborating the sap than the leaves from a large number of weak buds. After passing through a chemical change through the influence of the leaves the sap descends carrying with it layers of woody fiber which causes the trunk to expand rapidly.

And by the way this is one kind of expansion that fruit growers everywhere can heartily indorse. This is changing the growth from a vigorous part to a weaker part and can be accomplished only by pruning. I know there are some who will raise the old stereotyped cry that the central stem should never be cut back. The reasons given for this notion are that in cutting back the central stem we destroy our foundation, so to speak, and have nothing to build on in the upward growth of the tree; and further, the tree will be crooked from the point the central stem is cut. That both of these conclusions are incorrect I think I can clearly prove. As we have before observed, when the trunk is headed back a number of buds along its sides starts into vigorous growth. I presume it will be conceded by all, that growth is always upward at the point where it is strongest. That is, if by any means the sap is directed or concentrated in a side branch or bud, the subsequent growth is quickly changed

from horizontal to perpendicular. Now as all the young shoots are growing vigorously—the sap having been pretty evenly distributed among them—we simply pinch off the ends of all of them except the top one. The shoots thus pinched back are checked in their growth and while they are forming new buds to extend their growth, the sap is directed into the top shoot or leader and as the natural tendency of the sap is always toward the most upright branches it easily keeps the lead. This is pruning to change the form of a tree and also to change the growth from one part to another. As to the crook or offset made by the starting of this side bud we should remember that offsets of such small proportions can not long remain such in young growing trees. They are soon absorbed in the growth of the tree.

Pruning for wood-growth or for fruit is conducted on the principle that whatever is favorable to the one is detrimental to the other. To illustrate:—If we cut off the end of a branch during the winter we notice that the buds on the branch near the cut start vigorously and make a strong growth as soon as growing weather arrives. Had the cut been made in June or July when the tree was in full leaf the probability is that very little if any new growth would have been made. Hence the importance of winter pruning or heading back for young trees to maintain the desired growth. While on a visit to the famous orchards in Grand Valley, Colorado, my attention was first directed to the practice of heading back young orchard trees particularly apple and pear. The trees were a picture of beauty and strength. This practice should be more generally adopted, especially with straggling growers. Such kinds may often be made quite shapely and upright by heading in their long straggling branches or those inclined to droop.

We need not expect to see a general formation of fruit buds so long as the tree is growing rapidly. How then shall we prune to induce the formation of fruit buds? Two methods are commonly resorted to—pruning the branches while in full leaf to check the growth, and root pruning for the same purpose. That being accomplished the sap flows slower and is said to be less watery and of such a nature as to transform wood-buds into fruit-buds. There are several well known practices that will bring about the same result, such as boring a hole in the tree,

filling it with sulphur and plugging it up. The result however, would be the same if the hole was filled with any other substance or not filled at all. Another practice is to drive a tree full of nails in the dark of the moon in August. I have heard of some who have failed to obtain fruit by this practice. I have no doubt they did the work in the wrong month or probably in some other phase of the moon. We can not be too careful about these matters. This reminds me of a certain disciple of the moon Luna—tick shall I call him?—that came to me to buy a bill of trees after they had attained full leaf. I began to try to tell him that it was rather risky to plant trees so late in the season, but he interrupted to inform me that he had been waiting for this very time when the moon was just right. Before getting him off with his trees he very freely and graciously enlightened my benighted mind on many things pertaining to the moon, most of which I must confess I have forgotten. One thing, however, he charged me not to forget, and I did not, and I have kept all this knowledge to myself and now for the first time give it to the public. It was this:—Never by any means prune a tree on the twenty-first day of August. One small twig cut on that day was sure death to the tree.

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#### DISCUSSION OF PRUNING.

Major Holsinger, Kansas.—I would advise you to prune on the thirty-first day of June, never before or after that date.

Long before I heard of Mr. Stringfellow of Texas I pruned the roots and saved the tops. I don't care in planting a tree whether it has any roots, but I want a good top. The leaves are the lungs, which are the life of the tree. The more top a tree has the more leaves it will make early in the season and the sooner it will take root and become established after transplanting. I never cut back the top except to head the tree; that is all the pruning I ever do. I want a tree not more than two and a half, or three feet high at the outside. The idea of cutting off the top of a tree to balance the loss of root is ridiculous. Would you cut off a man's head to balance the amputation of his foot? Leave

your top alone.

Sam. Miller.—I planted 500 trees last spring according to String-fellow's method, and did not lose five trees.

Maj. Holsinger.—I once took four trees just alike, left only an inch of root on two of them, and cut back the tops of the other two. These died. Those with the roots cut off lived and bore fine crops of fruit.

Sec. Goodman.—One experiment don't prove anything. We have planted 275,000 trees in orchards in the last five years. We have found two year trees, with the tops cut back one-half, only injured roots being cut off, the best. We have had very little loss, sometimes not more than two trees in a thousand. We have had remarkable growth. In the peach we prefer medium size trees, one year, four to five feet. You will scarcely find a missing tree in the thousands we plant. The peach should have all side branches cut off when planted. The apple should have the branches cut back one-half their length. Trees one year old with both tops and roots cut off are just like good strong root grafts; nearly every one will grow, but I prefer the other way. The result shows it is all right.

J. H. Jones.—I would like to know the advantage in selecting two year trees and cutting back when you could take good one year trees. I was almost born in the nursery and know something about trees. We planted an orchard of two year trees in the fall of 1872. The hard winter killed or injured nearly all of the Rome Beauty trees. These were replaced with one year Ben Davis in 1873. In 1883 the one year trees came into bearing with the two years, and have since that time done almost one hundred per cent better. In planting in Kansas I used mostly two year trees, but about 1,500 yearlings. They were so small that you could scarcely see the rows. All the roots were taken up in digging these little trees. The first year I almost thought we had made a mistake in planting such small trees, but I wish you could see those trees now. They proved to be all right. What is the use of buying two year trees and cutting off most of the top? Yearlings will do as well or better, you can not rest your conclusions on the results of two or three years, you must take fifteen or twenty years. We find the Rome

Beauty beat the Ben Davis on the home stretch in the fifteen or twenty years. In regard to the Stringfellow method: Judge Woodside of Dent county, west of this, used it in part of a 150-acre orchard. It was a failure. The other part of the orchard is good. In Southeast Texas, where Mr. Stringfellow plants trees, they grow many from cuttings, no roots at all. It is very different in this latitude.

Sam. Miller.—If I live I will plant an orchard next year with grafts, putting them where the trees are to remain.

Mr. Tippin.—We planted 1,200 Elberta peach trees this year, cut the roots to two inches and the tops to straight whips. Only three failed to grow. Prof. Stinson looked over this orchard and I think he will tell you that Mr. Stringfellow can not come up to it. We follow the plan that gives best results. It will be a mistake to follow up the Stringfellow method in this Missouri country, with our hard dry soil. You will not have success. I packed apples this year in a six year orchard set with grafts, they are dying and failing very fast. As to the age of trees to plant there may be question. If you can plant one year trees and take care of them they will do just as well as two year trees.

Mr. Baxter.—We tried the Stringfellow method in Illinois before we ever heard of Stringfellow. Trees planted with an iron dibble failed.

Maj. Holsinger.—There is a difference between my plan and Stringfellow. I don't cut back the top. He cuts both root and top.

#### ROOT KNOT.

C. C. Bell, Boonville.—I have here some samples of Lady Apple trees from a little nursery of trees which I grow for my own planting. Here is something that looks like trouble or disease [the trees had root galls or knots at the point of union of scion and root, about as large as hickory nuts] yet the trees in the nursery look all right, growing some three and a half feet at one year and five to six at two years. The question is, is the tree fit to plant? will it succeed with that knot on

it? If it will, I want to plant it. I have Ben Davis, Gano, Winesap, Huntsman, several varieties in the nursery, but the Lady apple is the only variety affected; and one hundred per cent of that variety have these knots. Is it peculiar to the variety? If it is a disease or anything that will kill them, I want to burn them up. It is strange to me that all the other varieties are exempt, standing alongside each other. Jonathan, next to the Lady apple is sound—no knots on them. These trees were grafted by an experienced nurseryman. The scions were cut from my own orchard. Everything above ground looks all right.

J. C. Whitten.—I wish I knew more of that root gall. The most I know is that Prof. Toumey of Arizona says it is caused by a slime mold in the soil. It may exist in a soil where no trees have been grown. Some Maiden Blush trees with these galls on them, planted six years ago are still affected. I would not plant such trees in an orchard. I can not tell why some trees and varieties seem more subject to it than others, any more than I can tell why two men may be equally exposed to the measles and one of them take it and the other escape; or two boys may have the same chance to take the whooping cough; one of them may take it and the other escape. It is not confined to special varieties, though some may be more subject to it than others. It occurs upon seedling as well as grafted trees. I think it more liable to attack grafted trees in the wound at the union of stock and graft where it can get a start in the tender tissues.

C. C. Bell.—I would like to ask whether it will kill the tree?

K. B. Wilkerson.—My attention was called to this root gall some five or six years ago. You will find it upon all varieties. The tree begins to die when the knot chokes it. We discard such trees when we find them. Some trees live for several years with the galls upon them.

Mr. Stanton, of Illinois.—I notice Prof. Forbes is to have a paper upon this very subject at our next meeting. He has experimented for two years. He has found no remedy that is effective; but washing the roots in Bordeaux mixture or strong soft soap, is said to prevent its development. I don't like to say much upon anything of which I have had no personal experience.

Mr. Tippin.—I am very glad Mr. Bell brought those trees to this

meeting. I don't know but they may lead us to some light. This gall seems to be on the increase. These three samples are all affected at the point of connection between root and graft.

C. C. Bell.—It is there and only there.

Mr. Tippin.—I suggest the experiment of using a long scion and a short root, thus putting the point of union deep in the soil, and causing the scion to send out roots of its own. Perhaps such trees would be less liable to this root gall.

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## ORCHARDS.

By J. E. Thompson, Windsor, Mo.

**Profitable Varieties**—This matter of profit enters largely into everything of life and is the incentive to all action.

In treating this subject it will be our aim to give all the burden of our thought to the novice. It is unnecessary for me to attempt to enlighten these old "war horses" that have fought the battles of horticulture all these forty-three years of our existence as a society. If however I can make the way clearer, or in any way lighten the burdens of the novice, or send to one side of even one of the many pit falls that so thickly beset the way of the horticulturist, then I will be glad indeed that I have been given the opportunity of presenting you this brief paper.

In ascertaining the profits on an orchard we have to consider the many different sides of this subject. First the variety to be profitable must be a success in the grafting room, or budding field. If it will not succeed here then the variety will not be profitable as the cost of production will be too great.

Next the profitable variety will be a success in the nursery. It will produce a good sized tree all rounded out in its beautiful symmetry, well balanced, smooth and straight.

It will then be handed to the orchardist and there it must continue its same qualities and will make a well balanced tree, hardy and strong.

Then, too, the profitable variety will have to stand the test of being a good prolific producer. This will not avail unless the quality comes up all O. K. And even now you are not in possession of a profitable variety. I care not if the tree be ever so good a thing in the budding field or grafting house, nor yet how well it may flourish in the nursery, or that it may grow and grow and flourish like the green bay tree, in the orchard. It may be loaded to the ground with fruit and same may be of the quality that will make the gods smack their lips, and still you will not have a profitable variety, unless there is added the most important item of all: C-o-l-o-r. I wish to impress this one item upon your mind, my novice reader, the big end of the question is solved when you know that your fruit will have color.

The profitable variety will be a success in the budding field, in the grafting, house, in the nursery, in the orchard, in the threefold, capacity of good tree, good bearer, good producer. On the market or in the home as a producer of good quality, and good C-o-l-o-r. It will have to possess all of these items and the resume, as per above will hold good in any kind of tree fruit. I make this statement advisedly and any who undertake to produce profitable varieties of fruit and discard one of the least of these qualities will get left.

The profitable varieties that have been tried under my own personal observation are in apple: Early Harvest, Red Astrachan, Red June, Yellow Transparent, Duchess,, Maiden Blush, Rambo, Wealthy, Jonathan, Huntsman, Rome Beauty, Winesap, Jeneton, Ben Davis, and that child of Ben Davis, Gano, redder and smaller but of slightly better quality, Little Romanite, York Imperial. Sweets: Sweet June, Talman, Price, Bailly. All the foregoing are profitable each in its own degree, for the family orchard and near by market but if you are growing for the shipping market and the apples have to be barrelled, then cut this list down and cut hard, prune it to, Ben Davis, Gano, Winesap and York Imperial, these four and no more.

In profitable varieties of peach: Plant Arkansas Traveller, Early



Rivers, Foster, Gen. R. E. Lee, Crawfords, both Early and Late, Champion, Crosby, Elberta, Old Mixons, both free and cling, Stump the World, Heath Cling and Salway. All these are O. K. for both the family and the home market and will give a succession of delicious fruit from early July till frost. But if the fruit must reach a distant market and be boxed then prune this list to, Elberta and Stump the World. These two will do.

Profitable varieties of cherry are reduced to one and that one is Early Richmond. All others will do something but you will get your cherry off the Early Richmond.

Profitable varieties of plum are: Wild Goose, Abundance and Burbank. These will go anywhere and do fine services at home.

I can not close this without sounding the tocsin of warning to all contemplating planters, against that class of advertisers who flaunt and vaunt their wares before the novice with vastly overdrawn pictures and descriptions of their wares in illustrated catalogues. These unscrupulous persons declare to the world that they have been smarter than all the rest of the world and found something brand new that is vastly superior to anything that has ever been discovered. I wish you to understand that there is always a big handle onto this fake that they ask you to lift and its name is "much money." They are not all bad but I want you to know that this bait is set for suckers and ask you not in any way to get it into your head that you have found the best thing going and buy the whole thing out, but if you must bite and lose your money, bite easy.

You will thank me for this awhile afterwards. I wish every one of you success.

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## PREPARING LAND FOR ORCHARDS.

By John Ware—Wappopello, Mo.

To place my thoughts on paper for the reading of practical horticulturists, is something that I have never attempted, and I wish that the

task had been given to some one, in this part of Southeast Missouri, better qualified than myself.

I will deal only with our high ridge land which for ages has been covered with a heavy growth of timber; consisting of white oak, post oak, gum, hickory, blackjack, and black oak.

After a careful grubbing, clearing and burning (if I wished to plant on fresh land), I would plow as deep as I could plow, such land, then cultivate to sow crop, corn preferred, checked one-half feet each way, would cultivate with that man and horse killer, the double-shovel, so as to loosen the ground deep, and at the same time tear out the small roots. As soon as the corn is ripe, would cut and shock in rows between which I would want my rows of trees. With a turning plow, would back-furrow as deep as the team could pull the plow, between the shock rows. I would then harrow down fine, gather and burn the trash, would then consider that the land was in fine condition to receive the young trees.

If I was preparing land that was well worn, and most of our land in cultivation is that kind, I would if possible turn under a second crop of clover, in lieu of any other green crop, would use weeds, then sow to rye, and pasture through winter and spring, taking the stock off so as to let it get a fair growth by the 15th or 20th of May when with a good plow would break the field at least ten inches deep, then sow to cow peas at least one bushel to the acre, would pick what was wanted for seed, and pasture the balance with hogs, would back-furrow a strip six feet wide where I would plant my trees, I would put this six foot strip in as fine tilth as possible and think that I had a good bed for my young trees.

## THIRD SESSION.—December 5, 2 P. M.

The continuation of the Orchard Question was the topic for the afternoon and the first paper was read by Mrs. W. T. Flournoy.

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THEORY AND PRACTICE.

By W. T. Flournoy, Marionville, Mo.

In orchard raising, as in other lines of business, there appears to be no clear cut line between "Theory and Practice." The distinction is hard to make. A theory that will work out and be practical in one locality, will utterly fail in another. Then the theory is apt to be condemned, when really the governing facts in the locality have not been considered. Sometimes work is done on a certain theory and the result is better than expected. It is tried elsewhere, when surroundings are different and it proves to be entirely unsatisfactory. Since facts are stubborn, we must look around and see where we are wrong. This is often hard to do. I have not yet found out how to grow pears. I have quit trying, for it appears easier to grow apples. Surroundings fit my theories of apple growing better here and I have been more successful in that line. It is easier to tell of our successes, than our failures. Apple growing has its failures and disappointments, as well as other lines of business.

Trees set out in rows on a poorly selected location; poor soil for tree or fruit growing; poor selection of varieties, together with bad culture, of course, will not give good results, even if the trees are induced to live to bearing age. Planting trees and waiting for their fruiting is no, "get rich quick" scheme, yet with proper care, well directed work, "while you wait," as in other lines of business, if there is no accident, will win.

I believe that one of the main things necessary for successful fruit growing, is to secure plenty of moisture for the trees during the heated term. To secure that moisture has been my object from the time

my trees were first planted. It can only be done by selecting a suitable location and by continuous and thorough cultivation. My experience proves, that a level, smooth surface is much easier treated for any purpose whatever, than one too rolling. The rolling land under cultivation will commence to wash into ditches with the first moderately heavy rains, which makes that land unsatisfactory. In my locality, a clay soil seems to be, usually, best, for it washes least, therefore, keeping in the soil, about the trees, that which is given as a fertilizer. Neither does a level surface run the water off, before it can be soaked into the ground. The drawback to this thorough cultivation is, that at the end of the long drouth, your land is perfectly clean of all vegetation; the surface is very loose and the rain that you have been long waiting for, is apt to wash away a great part of your dust mulch, which is a part of your fertile soil.

Some one else will say, always plant trees on rolling ground. That is his theory, probably his experience. The other is my theory and my experience.

While you may think your orchard may suffer from the lack of fertilizers, it is my opinion it suffers more for want of moisture than from any other one cause. As trees get old the fruit gets smaller and after awhile the "bitter rot" and other diseases commence in some places. It is said, by many who see an Old Orchard in this condition, that it is too old to be profitable. It may be located on good land, but it has become overcrowded; the trees being too thick, the fruit, if not small and knotty, is often ruined by bitter rot. If there is any room between the trees for vegetation, it is usually occupied by weeds, grass, or some other wild growth, which consumes what little remaining fertility and moisture is not used by the trees in keeping them alive and growing poor fruit, that begins to rot and fall off as soon as the first warm days of summer come.

It is usually the case where a lone apple tree grows in a cultivated field, that it sets full and maintains a very good crop all through the long hot summer until harvest time in the fall and so continues to bear almost every year as long as it lives, which is usually a long time.

It proves that the tree has not been robbed of its moisture and fer-

tility by surrounding fruit trees, as is the case with thickly set old orchards. If the trees had been set far enough apart, they would not need so much thinning or pruning to reduce the area of ground surface that the tree requires to keep up the wood-growth and fruit growing capacity. The small area usually allotted to the tree can not supply the necessary moisture and fertilizer. This area allotted to the tree, I believe to be the best fertilizr to be had for the money there is invested in it. This area we must plant occasionally in leguminous plants that can be cultivated, such as cow peas. The dust mulch will retain the moisture, if the trees are not too close together, so as to absorb the moisture too quickly. For want of proper nourishment, scale and other insect pests will prey on the trees like vermin on poorly fed and cared for live stock. The old adage "an ounce of prevention is worth a pound of cure," will apply well here.

I have never used, or even tried commercial fertilizers. On one orchard I have used wood-ashes and barn-yard manure and cow peas. I rather liked the effect of wood-ashes, for I thought there was less bitter rot there than elsewhere, and I fancied that treatment may have been the cause. This soil was originally a tight, though worn out gravelly soil.

This treatment of manure and ashes was given at about the same times, between the time of planting and the sixth year. The orchard is now eleven years from planting; has had several crops of cow peas grown on it and has furnished two or three crops of fine apples.

There is another orchard that was planted in the year 1891, on land that had been in cultivation, not less than forty years before the trees were planted. It was too worn for any grain crop to do well, yet it made good apple tree growth when it was cultivated. It was too poor for weeds to grow well, but I planted it in cow peas and grew a very good crop, which left the ground in a loose friable condition. That was two years ago. Since then I have cultivated the ground clean and have gathered the finest crop of apples from it this year that I have ever raised.

Of course I sprayed these trees most thoroughly, thinned the fruit and otherwise cared for the apples, aside from cultivation.

There are many orchard specialists and each one, I suppose, has his line of pet theories, but after all, the key note of success lies within the individual himself. He must be able to judge of his surroundings, if he would prove his theories practical. In the orchard business, as in everything else and in every other business, "man is the architect of his own fortune."

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## CLEAN CULTURE VS. INSECT CROP RAISING.

By C. J. Zeiting.

As a good argument against the slaughter of birds some naturalists have made the assertion, that if the world should become birdless man would not inhabit it after nine years, in spite of all the sprays and poisons that could be manufactured for the destruction of insects. The insects and slugs would simply eat up our orchards and crops. Why is it that these naturalists do not give a method of preventing noxious insects coming into existence. If a good housekeeper finds insect vermin in her house she not only seeks to destroy the insects but she takes great pains to clean all the clothes and furniture; she sweeps, cleans and scrubs every room and closet in the house; she cleanses every part of the cellar and is liberal with lime, ammonia and other antiseptics, she has every cause of foul air removed from the house and burned, and if the first cleaning be not successful she repeats it and by the most persistent efforts she succeeds in making her house comparatively free from noxious vermin and insects. But if her house adjoins another, as is generally the case in a city, her efforts may be frustrated by the untidiness of her next-door neighbor, whom she loves so well that she does not like to even hint at the trouble, and so ceaseless vigilance alone can keep her house inhabitable.

But how is it with the farmer and orchardist? Why, he empties

his hog pen and barn of the most loathsome filth and spreads it on the farm, where he expects to raise crops. He does raise crops, and his crops of insects are greater than his crops of grain and fruit; he shoots off the birds that would lessen the number of insects and in the fall he finds the insects have eaten one-half his crops and spoiled nearly all the remainder. Now why does not the farmer take a lesson from the experienced housewife? Why not burn up all the filth and weeds, use only the ashes; sow clover; spade or hoe around the trees and fertilize with lime, wood ashes and even ground stone; plow in his sweet clover between the rows, and lay the foundation for pure farming as the housekeeper does for pure house-keeping? It is true his neighbor's insects might infest his crops for a time, but if he persist in the right course, even his slovenly neighbor may learn wisdom and ultimately do likewise, though it strikes me that here more than anywhere else cleanliness is next to Godliness.

Clean farming means the abandonment of hog pens, filthy stables and slaughter sheds. It is as essential to pure vegetables and fruits to feed them with pure food as it is to feed animals and man with pure food; corruption will breed corruption in farming as it does in everything else.

Of course the wisest of the farmers compost their manures and endeavor to neutralize the bad effects of decaying animal matter, and the use of animal manures in early stages of decomposition is usually condemned by agricultural journals, but I want to say to you, ladies and gentleman, nothing but radically clean methods can prevent the raising of insects and then the constant application of poisonous powders to kill the insects, and the spraying of trees and plants with solutions of Paris green and other chemical combinations render fruit and vegetables to some extent poisonous. Potatoes are often bitter and other garden produce are affected dangerously. Grapes have sometimes been condemned in the markets on account of the Paris green visible on the bunches.

It is not time to seek out the causes that produce their insects? It seems to me right here an ounce of prevention is worth a pound of cure. Scientific men are dumb on this subject. They are ready to

prescribe a poison to kill certain insects, but we have yet to find one who touches the cause of the ever increasing insect pests.

Farmers must learn from their cleanly house-keepers and apply it to the farm.

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## DOES IT PAY TO KEEP UP AN OLD ORCHARD?

By A. A. Blumer, Fredericktown, Mo.

I consider the orchard commercial or domestic, an adjunct if not an integral part of a Rural Home, whose dwellers own and enjoy its fruits. What can on earth give more pleasure to the palate, afford more healthful nourishment to our system and more satisfaction to our desire than a well ripened winter apple or pear. If the orchard has been educated, pruned, well cared for and fed, if necessary in growing old, by maintaining its fertility, I believe it pays to keep it up. Why? How? Simply by bearing moderate crops of fruit, moderate but handsomer specimens larger in size and richer in flavor than in its youth. I have seen old orchards, says Peter, whose miserable fruit was not worth looking at. I have seen old trees says Paul bearing the ugliest, poorest specimens unworthy being called fruit. Well—I have seen a bearded woman in France and have seen another one in America, one swallow it is said does not make a summer. I have seen old orchards with a tripple crown of sprouts at the foot of each tree, and a forest of twigs of all sizes above, a true abode of insects, caterpillars, and spiders of all descriptions, an indisputable nuisance where existing and a nursery of mischief to adjacent land, such orchards (if they deserve the name of) ought to be cut down and burned.

But everything in this world comes to an end, *mento moris*. When the last effort of an orchard hitherto generous and grateful for many decades approaches the end of usefulness, it may be advisable to set out a new one on new well drained land, not where the old trees stood, whose soil is now exhausted of plant food, on land as high as possible



with a northern or western exposure, avoiding rich bottom land. A fruit tree is like a marriageable girl, if you love her truly she will bring you happiness, so will the tree, but if you neglect her after marriage she will neglect you, so will the tree you have planted and neglected, tit for tat.

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Discussion.

E. A. Riehl.—I was born a Missourian and was a member of this society before a good many of you here knew anything about it. I don't like to speak now because I am a good deal of a kicker; and on some of the papers read here I can not do anything but kick. I think we had better not speak.

Sec. Goodman.—We want to hear from Mr. Riehl.

Mr. Riehl.—I have some very clear thoughts upon the subject of how to make our business pay. I think fruit growers make no greater mistake than to reach out after quantity and to put upon the market inferior varieties of fruit because they are productive, or inferior grades of good varieties. I have had forty years experience. In the last ten or fifteen years our markets are being run down by poor stuff. It is not only that it brings the larger quantity on the market, but the poor is used as a club by the dealer to knock down the prices of the better. If a man buys a basket of peaches to take home to his family and they find them unfit to eat, he will say "We will not buy any more peaches." If the fruit had been good they would have wanted more. To grow good fruit, cultivation, pruning, spraying, and fertilizing, and everything, must be considered. It will not do to say that you must cultivate, you must fertilize, you must spray in order to raise good fruit. Every man must know himself, his soil, his climate and the market he intends to supply. All these things must be known to make a success. It is the same in horticulture as in any other business.

Sam. Miller.—The finest peach I grew this year was in a clover sod not plowed for seven years.

J. C. Evans.—It seems to me we have a fair knowledge of how to care for an orchard if we remember what has been said.

## PACKING AND MARKETING APPLES.

A. T. Nelson, Lebanon, Mo.

The subject assigned me by our worthy secretary, the packing and marketing of our apple crop, is a subject that has many difficult phases. Take 1899, the year of the intense drouth and hot weather, weather so hot in October that apples fairly cooked in the cars. 1899 will be long remembered as a year of disaster to most of those who bought, packed and shipped to the regular markets. The packing season just closed has been another exceptional one; starting out as we did with a sixty million barrel crop of apples, a crop larger than any one apple crop preceding it, and every receiving point sending out deceiving letters about the immensity of this year's crop, while at the same time many of the large operators had men all over the country where good apples were to be had making contracts for crops. This, to small dealers like we are, seemed all wrong; yet knowing what the extent of the ravages of the bitter rot, the soft rot, and the loss by storms, we did not let the sixty million barrel crop deter us from what we started out to do: We started out to pack 15,000 barrels, we wound up on 17,000. The usual trouble confronting the commercial orchard grower or the buyers and packers in the open fruit market is, first shall I sell as soon as apples are picked and packed or shall I hold and take chances of rotting of fruit or the ups and downs of the apple market, if the country growing fine apples has sixty million barrels? I had better sell at first fairly good price offered for my crop; it is well remembered that in 1896 those that sold early did the best with their crop and apples that were held in storage made little money if any at all, and many of the 1896 packers lost plenty of money. To make a success in either growing for shipping purposes or buying to ship one should either have some kind of cold storage to carry his crop or should have arrangements made at a good distributing point where good cold storage can be secured; but if the cold storage is not at your own city or near where your orchard or packing is located, then in that case you must arrange through an honorable commission house to receive your fruit and see

to its going into cold storage just as soon as it arrives at point of destination, not only this but see to it that your fruit is well and carefully handled. I have often heard different apple growers and buyers make these assertions that there are no honorable commission men in the business; they may be all right on one or two shipments but that is only a bait, you will get caught sooner or later. I am prepared to take strong grounds against these assertions; while it is a fact, the fools are not all dead and there are men sending flaming circular letters out to fruit growers whose names have been furnished by postmasters or railroad agents at so much per dozen names, they as a class, are a good lot of commission men, so-called, to severely let alone. After a few years of dearly bought experience we have found a house that is honorable, fair and square in all their dealings; a house that whether you have one car or ten cars of apples, peaches or strawberries in their hands to sell you will be fairly dealt with every time. And I am proud here and now to name them Porter Brothers & Company, Minneapolis, Minn., whom our good friend Geo. Tippin so ably represents.

Mr. President and apple growers of this society, there are no doubt many other just as honorable business men but they are hard to find. Now our arrangements are all made, we are ready to go into the orchards. Our rule has been to do as much packing in the orchard as is possible and at the same time profitable. We start with baskets, ladders and packing tables. These tables hold about two barrels of apples, are built with an incline, are slatted on the bottom so that leaves, twigs and small apples drop through. These tables save the work that two men could do. In working three men at a table you can pack two car loads a day, with five tables; it takes eight pickers in average orchards to keep one table going. Our teams are always on hand to move the apples direct to cars or warehouse when cars are not to be had. In our busy time this fall we were working twenty packing gangs and we put many car loads of fruit from the orchard into cold storage in Minneapolis in seventy to eighty hours. Some may ask why such haste? A fall like the past has been, you ride through your orchard and see trees loaded with beautiful fruit, nearly free from spot or blemish and in four or five days go back and you see that fatal disease has begun

to develop. Now these scientific men with us at this time will tell you that diseases will not germinate in a temperature of 32 to 34 degrees at which point we are keeping our apples; hence you will understand the reason of quick rapid movement from the orchard to cold storage. Many, very many, of our growers made more money selling their apples early at \$1 per barrel hanging on the trees than to have held them thirty days and got \$1.25 as others did. Our system of packing may differ from many packers; we try to buy all fruit possible, buying on the trees at so much per barrel we to pick and pack. In packing the past season we made two grades, our gold medal brand and straight packed brand, and to show you what this means, will say that out of 17,000 barrels only 3,000 were allowed to carry the gold medal brand. We are working to make this brand known all over the northwest. As it were, I am only an amateur in the apple business but the one who guides this work was handling apples before I was on the stage of action and much of the planning is still done by him and I carry it out; thus carrying out that old, yet true, saying. "Let the older men do the counseling and advising and the younger men do the work." One more word and my paper is closed and it is not in line of packing apples. What great benefits I have received since attending the regular meetings of this society in listening to the men who have borne the burdens of life these many years, men whose hair is white or mixed with silver locks. May these veterans in horticultural work be blessed with years more of usefulness and help to create enthusiasm in hundreds of the young men scattered over the State of Missouri, and may they when they lay down life's burden feel and know that they have in these lines built monuments to their memory all over this imperial state of Missouri.

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#### Discussion.

G. T. Tippin.—To make a long story short we have reached a time when, if we want profit, we must put up a respectable package, outside and in, and all through. Competition is so great that only he who packs

well will succeed in finding a market. The people I represent have bought a brand, and make this brand do what it says. If you do this you will succeed in finding a market. The people I represent have bought something over 200,000 barrels of apples this year. They pride themselves upon packing their own fruit. They don't send a man to over-see Mr. Nelson's packing. They know him well enough to trust his packing. A man may be dishonest in some things, but it takes a man with a pretty hard conscience to stand up before a customer and say "I guarantee this package to be the same all through," unless it is the same all through. If a man is selling something to his customers he wants something he can recommend. You can see the importance of putting up a straight, honest package. I do not believe there is any place in the market for number two stuff. I will give you a little incident. A buyer in Canada found a man with an orchard of Northern Spy apples for sale. The owner's price was one dollar per barrel every thing to be taken. The buyer offered him two dollars per barrel for the number one apples leaving the number two and the culls for the owner, and said that he would take at least two-third of the apples. "No, sir," said the owner, "I will not allow any man to pick my apples, you must take all of them or none of them." So the buyer bought them at the owner's price of \$1.00 per barrel, and graded to suit himself. When he was done packing he found that he had put three-fourths of the apples in the number one grade.

With the great amount of apples now being produced in the United States there is not much room for number two apples. Make your pack honest; and if the circumstances are such that there is a market for number two stock, let go as number two, and not try to palm it off as number one. I am a farmer and grew up between a rock and a stump. I have always fought the battle of the farmer; but I am almost ashamed of what some men do when they pack their apples. It made my heart grieve, when in Western New York, to catch an old deacon of the church putting stove wood and pumpkins in the middle of a barrel of apples.

Sec. Goodman.—Report from Paris said it would be impossible to sell fruit there without thorough inspection. Every barrel must be

emptied upon a table. The local growers and dealers bring their fruit to market packed in single layers, so every specimen can be seen. These fruits bring enormous prices. Sometimes a grower will bring to market only a dozen peaches at a time. These are very expensive. This is true to some extent in other parts of Europe. We must have an opening in Europe for some of our apples. The government is experimenting upon this subject of finding a foreign market for some of our fruits. When the apples we sent to the Paris Exposition were opened, the dealers in that city would offer from three to five dollars per bushel for them.

A. Nelson.—In speaking of care in packing I am reminded of a barrel of apples sent to Manilla in the Philippines. They were forty-seven days in transit yet arrived in fair condition after that long journey over tropical seas. This shows we could ship apples to Paris in perfect condition; but here comes in the necessity for careful selection and packing. It has been shown that apples can be successfully sent to London, Paris or other European cities. I think the time will come when we will ship these beautiful apples almost all over the world. I do not think we have reached the point when we are getting the profit out of our orchard work we are entitled to. Take horse sense and put it into your business.

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## COLD STORAGE FOR FRUITS AND VEGETABLES.

By P. M. Kiely, St. Louis, Mo.

That there is a necessity for cold storage for fruits and other perishable crops no one will deny. The value of this agency in saving the surplus crops is of immense advantage to the producer, as he profits either directly or indirectly through it—indeed he is the principal beneficiary. Cold storage plants have multiplied very rapidly the past five years. The City of St. Louis, for instance, has five times the cold storage capacity to-day it had five years ago, all modern, up to date struct-

ures that are equipped with the best of everything required. The principal operators in apples who formerly stored thousands of barrels of apples in Michigan and New York and elsewhere, need no longer go abroad for cold storage space at reasonable rates and good service.

Cold storage establishments should have only two objects for their existence; to carry through the season the surplus crops until there is an opportunity to unload them, and incidentally to afford an opening for a legitimate investment—the cost of constructing them. Just as soon as the spirit of speculation arises in the management of same—well, that usually marks the beginning of trouble. Danger and losses lie that way. Strange as it may seem, while these plants have been highly beneficial to so many, they have lost fortunes for others—the result of speculation and bad management.

One of the largest plants of the kind in the United States failed in Chicago a few years ago, carrying down in the wreck several small fortunes of stockholders. The management was anxious to fill up the establishment and in its anxiety for business made very liberal advances on goods, largely on eggs. The egg market declined to a surprising extent, away below the sum advanced, and thousands of dollars were lost in this and other ways—all of which go to show that while these establishments are of immense benefit to the producers of the country, other investors in the same enterprises are often heavy losers. Many of these plants are filled up with a variety of products bought outright in the open market, so you see the projectors often drift away—frequently forced to do so for want of patronage—from the original plan of management.

To the orchardists and apple growers of the country cold storage came as a veritable boon, lending the apple orchards a value they never had before, and making the fruit almost as staple as wheat. Through the agency of cold storage every apple speculator can go into an orchard, set a value on it and purchase it, and he generally pays what it is worth. He has six months of a season in which to dispose of the fruit and has the whole world for a market. Indeed, foreign markets have proved attractive and profitable for many, so the speculator has a wide field to seek and watch for an outlet.

STORAGE CHARGES.

The cost of storing arises at once as an interesting question. The matter of expense has been steadily reduced with the increase of cold storage plants, until the present time, when storage facilities are within the reach of all. A few years ago when storage space was scarce, the apple men had to pay fifty cents a barrel for the season, and although some of the fruit might be withdrawn soon afterwards, no allowance was made. These stiff rates and arbitrary terms led to the many new plants in sight now. The big concerns here charge fifteen cents a barrel for apples for the first month and ten cents for each additional month of fractional part thereof. The rates for pears, quinces, etc., are about the same. They have two seasons, the summer season of five months, May to October, and the winter season, five to seven months.

TEMPERATURE, KEEPING PERIOD—BEST PACKAGES.

The best temperature for fruits and vegetables in cold storage was carefully investigated by the Kansas Experiment Station, and as the experience of our most successful storers of perishables here does not vary much from it, we submit it in full in the following table:

Product.	Temperature.	Best Packages.	Keeping Period.
Apples, summer....	38 to 40 deg. ....	Bbls. or boxes.....	2 to 4 months.
Apples, winter....	32 " 35 " ....	" " " .....	5 " 8 "
Pears .....	33 " 38 " ....	" " " .....	2 " 4 "
Peaches.....	36 " 38 " ....	Crates .....	2 " 4 weeks.
Grapes .....	38 " 40 " ....	Sawdust boxes.....	6 " 8 "
Plums.....	38 " 40 " ....	Crates .....	2 " 4 "
Berries, cherries .....	40 " .....	Quart boxes.. ..	1 " 3 "
Watermelons.....	40 " .....	.....	3 " 6 "
Muskmelons.....	40 " .....	.....	2 " 3 "
Tomatoes.....	38 " 40 " ....	Crates .....	2 " 4 "
Cucumbers.....	38 " 40 " ....	" .....	1 " 3 "
Cranberries.....	34 " 38 " ....	Barrels.....	
Onions.....	34 " 40 " ....	" .....	
Potatoes.....	36 " 40 " ....	" .....	
Cabbage .....	34 " 36 " ....	Crates or bbls .....	

From the foregoing you will see that summer apples require different treatment from winter sorts, being far more perishable or short-lived, and can be withdrawn more successfully from a milder tempera-



ture. They can be stored only half the time allotted to winter varieties. The Kansas Station remarks that: "The value of cold storage for juicy summer fruits like berries, grapes, peaches, plums, and vegetables like the tomato and cucumber, is not in keeping them from one season to the next or from early to late seasons. It can not do either. It is only in holding them over short periods of stagnation and gluts in the market. A weeks time, and frequently a few days, is sufficient for this."

Vegetables are not stored as freely or as profitably as fruits. Cabbage, potatoes and onions are the most stable and find their way into cold storage. Each must be either barreled, boxed, or sacked as in bulk will not keep well, as the cold air will not penetrate such goods in bulk. Neither can the space be properly utilized unless the goods are barreled, boxed, crated or sacked, as such packages can thus be piled up and a more uniform distribution of the cold air follows. A sack or crate, for instance—half barrel capacity—would carry at about half the price of a barrel. Dried fruits can often be stored to advantage and at very low rates, only twenty-five cents per hundred pounds for the season.

More expensive goods, however, come higher. Nuts, raisins, figs, etc., cost much more than fruits and vegetables—figuring on size of package or space occupied. Many wholesale grocers for instance hire rooms or space by the year, which comes cheaper, and so do poultry and game dealers.

Every farmer is interested in eggs and poultry—the only crops raised on the farm that affords himself and his family an income every month in the year—and these crops never fail. In a paper of this kind it is hard to ignore the egg, because the egg crop of the country has become a factor in cold storage earnings, and many of the big concerns find storing eggs a large and profitable part of their business. There is a wide difference in rates if we figure on size of packages or space used. The regular egg case (thirty dozen) in which all eggs are now stored, costs for the season (three to five months) sixty cents, and up to a few years ago the rates here were eighty-five to ninety cents per case. This storing season, May, June, July and August, is longer than the selling season generally, as most of the stock finds its way out to

consumers during November, December and January.

In closing this brief review of cold storage, its benefits, costs, etc., I must add that you can not always get the profits your calling can be made to yield if you ignore the existence of these establishments, which as I have shown, are of such great benefit to the fruit growers of the country.

### Discussion.

D. A. Robnett.—If any of you have any experience of either loss or gain by cold storage we will be glad to hear from you.

Major Holsinger.—I have some experience of apples in cold storage and while I met with success, I resolved I could take care of my apples as well and manage my own business. I was not pleased with the way they managed the business. The first one hundred barrels I took out were docked fifteen barrels for "plugging." I thought I would have no more plugging. I have not much confidence in commission men. I remember sending two car loads of grapes to St. Paul on which the returns were three cents per basket. They wanted me to send another load, saying the market had improved.

Mr. Tippin.—I don't believe commission men have anything to do with this matter of cold storage. You can ship your own apples and put them in cold storage in your own name. The new cold storage companies will rent space to the fruit grower. A man may this year get a good price for poor fruit in the west, but whenever there is a big apple crop in the west he can not get a good price for trash.

A. Nelson.—We have 1,000 barrels now in cold storage. We make our own bargain with the storage company. We take our apples out whenever we want to and sell them in the way we want to.

D. A. Robnett.—Has any one made anything from it?

A. T. Nelson.—We have made money every year for five years. We have never lost money on cold storage stock. It is the only redemp-

tion for the buyer or large grower. We pay forty cents per barrel for the season. The storage company has always been perfectly willing to find buyers to buy our apples and not charge us any commission. My experience in cold storage has been all right so far.

Mr. Atwood.—In Rogers, Arkansas, at picking time it was difficult to get one dollar per barrel for apples, but when I was there a few days since they were shipping from cold storage at \$2.50 to \$3 per barrel.

We have a very perfect plant in Springfield, capacity 30,000 barrels. Every man who has used it says it is one of the best he ever tried. We ought to have one in every town where much fruit is grown. Farmers could build cold storage upon their own farms. Cold storage is good for other things besides apples. In Springfield there are 300,000 one to two pound chickens in storage. They are all right, too.

Mr. Irvine.—I knew of a man in St. Joseph with 5,000 barrels of apples for which he could get only \$1.35. He put them in cold storage and sold them for \$2.60. One man puts his apples in cold storage, keeps them there, taking them out as he needs them, and selling them at retail. He supplies many people who are willing to pay for fancy fruit.

Secretary Goodman.—This Society began seventeen years ago to keep apples, for exhibition, in cold storage. It is no new thing. It does not pay to keep poor apples in cold storage. It will not redeem poor apples and make them better than when they were put in. If a stranger goes into a cold storage plant they will usually refuse to show you the fruit; but if by favor you can see them, you will be surprised at the poor quality of much of the fruit there. If apples are properly picked, assorted and packed, you will get them out in good shape. We ought to use it for what it will make us, but it will not pay to put in number two stock, as a rule. Some seasons it may pay, when fruit is scarce. In Chicago, at the World's Fair, we had apples of three years upon the tables. I know they will keep. I know of apples selling for two dollars a box right now; and Winesaps at \$1.40 a bushel box. They can hold these perfectly till May.

Major Holsinger.—It is not always profitable. Homer Reed had to send 170 barrels from cold storage to the dump. Sometimes I have lost. I can usually sell all my fruit on the market at Kansas City.

A. Nelson.—All of us have not a market for number two fruit every day. There is sometimes no number one to store. We put ten cars of number two apples in cold storage in Minneapolis in 1899, and made it a profit and a success.

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## BITTER ROT.

By J. C. Evans, Harlem, Mo.

Among fruit growers, perhaps more than any other industry, there are a great many questions to answer and a great many problems to solve. For over forty years, the members of this society at their meetings, have had to tackle some question or try to solve some problem; and in some cases those questions had baffled the skill of most of our scientists. It does seem, with an experiment station in every state and territory, and vastly more (and perhaps more efficient) scientists than we ever had, that we as fruit growers, should be permitted to follow our own calling and not be expected to squander our valuable time trying to solve the problems that are constantly coming up; but here we are again, face to face with one of the toughest ones that ever confronted us. Of all the destructive agencies that ever visited our apple orchards, the one to be most dreaded and the one we know least about, is the Bitter Rot. This disease has prevailed to a greater or less extent over the principal apple growing belt of the Mississippi Valley for the last three years, increasing each year at the rate of one hundred per cent, until the past year the crop of entire orchards that promised a full crop in June was totally destroyed. Its first appearance in our orchards was early in July, and up to the first of September thirty to fifty per cent was destroyed; some varieties almost entirely and others only partially. About this time a second attack appeared which spread more or less to all varieties and finished up Ben Davis and Gano so that not one per cent were fit to pick. These two varieties also suffered most from the first attack, while the varieties suffering least were Jonathan and

Grimes; but they were picked and shipped before the second attack was fully on and I am informed that they went down badly in cold storage and had to be repacked and sold before the fifteenth of November. Minkler, York, Clayton, Rome Beauty, Smith, Ingram, Winesap, and Mammoth Black Twig suffered about the same to the extent of a loss of eighty per cent. The fruit of old trees suffered most. In an orchard thirteen years planted the disease made its first appearance three years ago on a Ben Davis tree, and destroyed more than half its fruit. The next year (last year) it had spread over the entire orchard of one-hundred acres, and destroyed fifty per cent of the crop and the past season not an apple was picked from that orchard although (as above stated) in June it promised well for a full crop.

This orchard was sprayed three times each year with Bordeaux Mixture, but in spraying for scab and codling moth we are through spraying about the time we should begin for Bitter Rot.

It is perhaps a fact that constant spraying with Bordeaux Mixture, beginning early enough, and keeping the fruit covered with the Mixture long enough, the disease may be kept off; but it would require more spraying than the average orchardist is willing to do. If the spraying is neglected for a short time or the rain should wash the mixtpre off, the apple may expand and leave bare places for the spores to light and commence their work of destruction. These spores are very small and require only a small space on an apple for a start; they can be transferred to a sound apple by the prick of a cambric needle. The above conditions are about the average that I have observed during the past three years. A few young orchards in isolated places have borne good crops almost clear of Bitter Rot the past season, and the question is, will they get it worse next year? and will this pest continue from year to year destroying our crops or will it, like many other pests pass away as it came?

Most of our destructive pests are with us always in limited numbers but periodically appear in such forces as to be destructive.

We have had grass hoppers, army worms, chinch bugs, caterpillars, canker worms, potato bugs, rag weed and dog fennel but they rarely become a pest two years in succession. We have not been able

to determine just what conditions of weather, etc., are most favorable for the spread of the disease; we have observed some times that warm damp weather seems to cause it to spread rapidly and at other times have the opposite effect. We are of the opinion, however, that the disease will spread more in dry weather, but after it once has a start on an apple, that is after a spore takes root and the rot begins to develop, though the speck may be so small that it is hardly perceptible to the naked eye, then the warm moist atmosphere will hasten the rot and make it more perceptible to the casual observer. When the atmosphere is heavy and damp, the spores being naturally heavier than the air and requiring a breeze to blow them in order to spread the disease, it is natural to suppose that it would spread more in hot dry weather.

As it is something like forty-two or three years since the disease prevailed to such an extent and as it behaved then as it has this time, let us hope that we have had our worst year and that we will be comparatively free from Bitter Rot for many years to come.

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Mayview, Mo. November 28, 1900.

L. A. Goodman, Esq., 4000 Warwick Boulevard, Kansas City, Mo.:

Dear Sir:—

I am in receipt of program for the Forty-third Annual Meeting of the Missouri State Horticultural Society, to be held at Farmington, Mo., December 4 to 6, 1900.

I hope you will have a good meeting and feel sure that the different subjects brought up for discussion will be well handled, and that the report of Col. J. C. Evans on Bitter Rot of the apple will be especially interesting and thoroughly discussed, for Bitter Rot is now one of the worst, if not the worst enemy the fruit grower has to contend with, and as I have suffered considerable loss by it this and past years, I would like to ask a few questions for information in regard to it.

First.—What is Bitter Rot? Our books say it is a fungus; if so, how and when does it ripen its spores? and how is it that fully ninety-five per cent of the apples diseased are first affected on the side next to the sun between the hours of ten o'clock a. m. and two o'clock p. m.? It is a very rare thing to find an apple that was first attacked on the side that hung to the north.

Noticing the above peculiarity of the so-called fungus disease, Bitter Rot, the following questions present themselves.

Is the fungus the cause of the rot, or is it the effect of some other cause? But let me ask, what is fungus? Webster defines it as a mush-room, or toadstool; an excrescence. That definition will not apply to Bitter Rot. It can not be called a parasite, then, is it some kind of bacteria? If so, I hope some of our chemists will become sufficiently interested to give the subject a thorough investigation and ascertain what chemical changes take place in the fruit when it commences to rot: such an investigation might lead to a preventive.

If you do not consider me too tedious or out of place. I would suggest that we look to the climate or to the condition of the weather for the cause of Bitter Rot. Have any of our chemists or Experiment Station Professors tried to produce the germ or fungus of Bitter Rot? If not, will some of them take a green, juicy apple in July or August when the thermometer will register 116 to 120 degrees in the sun; perfectly calm, no air stirring, the apples feel to the touch like they were in an oven; now about noon place a large drop of clear water on one of those heated apples and watch the result? The sun's rays will be focused on the surface of the apple beneath the center of the drop of water, which will super-heat that spot to such an extent that when the water has evaporated there will be a small dark spot on the apple from which the rot will spread like the leaven in Holy Writ, until it includes the whole mass. If there is anything of merit in the above suggestion, I hope it will be investigated.

Now for a remedy or a preventative. There is no question about Bordeaux mixture being a great preventative, but how does it act? I do not think anyone claims it will stop the rot after it has started, but it undoubtedly, to a great extent, prevents it if applied in time; the solution is one of the best to stay on fruit and foliage and the frequent applications recommended keep the fruit, as we might say, varnished with it all summer; the lime in the mixture acting as a reflector and throwing off the sun's rays, prevents the fruit from being overheated, and causing the rain drops to run off the fruit like water from a duck's back.

If the above theory is correct the proper remedy would seem to be 'something to prevent the apple from getting too hot;' lime is a good reflector and might be increased in the Bordeaux mixture, and some other spray of a cooling nature might be tried that would not injure the fruit or foliage. It is a common thing in my orchards for juicy apples like the Willow Twig, Huntsman, etc., to be the most subject to Bitter Rot, and if this is generally the case, will our chemists tell us how much heat the saccharine and other juices of an apple will bear before the tissue or pulp of the fruit will be destroyed, and thus start the fun-

gus or bacteria, or both to work, in the process of decay.

I hope our Experiment Station (if it has not already done so) will investigate the rain-drop theory, and ascertain how much heat the apple will bear before its fiber will be affected and if its saccharine or other properties will be turned to acetic or other destructive acids; and if these changes will be brought about by the degrees of heat I have mentioned, I think we have the cause of Bitter Rot. Hoping to hear from you soon,

Yours very respectfully,  
WM. P. KEITH.

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Discussion.

C. C. Bell.—I believe Mr. Evans in his paper referred to a period of bitter rot forty-two years ago.

J. C. Evans.—It acted just as it has this time—a little one year, more the next and great destruction the third year. Such things are with us always, like the poor, but to a limited extent; except at certain periods when it becomes epidemic. Forty-two or forty-three years ago it was just as bad as at this time. It was all over the country.

Mr. Shank, Illinois.—We had bitter rot on the Romanite forty years ago. It is not new.

Sam. Miller.—Sixty years ago it was a very common thing in Pennsylvania. The Newtown Pippin and the Romanite were badly affected.

D. S. Helvern, Arkansas.—In Piqua county, Ohio, in 1856-7-8 it was very bad. I remember only these three or four years when it was bad. I have not heard whether it has since been bad there.

Mr. Tippin.—There is one thing about bitter rot I would like to hear discussed. Does it attack the apple at certain stage of development? The Early Harvest was attacked just as it was nearly ripe. Then the Maiden Blush next showed it as it was about to ripen, and so with the latter fall and winter apples. It seems to attack the apple as it approaches maturity, if the atmospheric conditions are favorable. I believe it is like the small pox, needing certain conditions of the atmos-



phere to spread it. If we have not such conditions it will not appear. Apples infected with the bitter rot will keep in cold storage. It does not spread at such low temperatures. To show that it takes a certain amount of heat to develop take some apples from an infected tree and put them into a box and keep them in a warm place. They will develop the rot and throw off spores in three and a half days, while it will take five or six days in the orchard. The reason is, the box is warmer at night.

Mr. Simpson.—Then why not hold apples in iced cars while loading and getting ready to ship?

Mr. Tippin.—The sooner they are put in cold storage the better.

Mr. Reed, Indiana.—Prof. Burrill says the bitter rot will not develop in cold storage.

J. C. Whitten.—At the station bitter rot has not appeared to any extent except in 1895. That year we were spraying for the scab and codling moth. We sprayed different plats from one to six times. Less than five sprayings seemed to have little effect in reducing the bitter rot; and less than five pounds of copper sulphate to fifty gallons had little effect. Six pounds and six sprayings very materially reduced the loss. Bitter rot develops worse in warm, wet weather. I don't know what temperature it requires, but much warmer than apple scab. In some season it develops earlier than in others. Much depends upon the weather. The spores require moisture like seeds. Warm sunshine after a shower supplies favorable conditions for its development, but it don't make the germs. These must be present or there will be no bitter rot.

Secretary Goodman.—Is there not some parasite which may destroy the spores of the fungus?

Mr. Whitten.—There is no such thing to our knowledge. There may be such a parasite but we have not found it. There may be something in nature to hold it in check. "Fleas have other fleas to bite 'em, and so on *ad infinitum*." If the bitter rot destroys the entire crop in an orchard or section of country the spores may perish for lack of food or suitable material in which to grow. It may be possible that the spores may become so numerous and thick that they may hold each other

in check, just as a crop of weeds may be so thick that they will not produce vital seeds. I think there is a chance for the disappearance of the bitter rot from natural causes, but that would be only a chance; and meanwhile it is destroying the crop. Let us find out when it begins to develop and spread and do all we can to keep it down.

W. R. Wilkinson.—I don't pretend to know much about root rot, but have had some experience with it in my Perry county orchard. I have had some trees to die from it and I want the Society to find the cause and the remedy. When my trees began to die no one could give any reason for it. I began to investigate, myself. I took five rows of trees, removed the soil from around them and applied a solution of five pounds of concentrated lye to fifty gallons of water, and replaced the soil. To the next five rows I applied one gallon of kerosene to each tree, poured on the loose earth around the roots. On the next five rows I used from two and a half to three and a half bushels of ashes to each tree. Those treated with ashes showed no results, the trees continued to die. So with those treated with coal oil. Not a tree died in the row treated with concentrated lye that year and only a few since. I dug three large cisterns in the orchard, to have plenty of water, and have treated four or five thousand trees with the concentrated lye, using three pounds, four pounds, or five pounds to fifty gallons of water. It has been a success. It will kill the aphids.

Mr. Von Schrenk. —I don't know much about root rot. I think I have samples of the fungus which I think does the mischief. A great many things cause the death of the tree from the roots. The woolly aphid is one; but this is very different from what is known as root rot. We have the root rot in South Missouri, Illinois, Arkansas, and Texas. It kills the roots. The tree above ground shows very little of the effects of rot till it is almost actually dead. This root rot grows through the soil. There is no doubt about it. It spreads through the soil slowly, perhaps two feet in a year. In the orchard we find the trees die in a small area, which can be traced to a center where the trouble started. From what I have noticed so far it is far more prevalent in newly cleared land. We can trace it to the oaks in the forest. We are trying to see if we can transfer it from the oak to the apple. I hope we will have some results

from Mr. Wilkinson's concentrated lye treatment. It is very difficult to tell whether a tree will have it or not. We have tried to infect a number of trees with the fungus and apply the various suggested or possible remedies. I would advise every one of you, in a locality where it is suspected, if you remove dead trees don't plant another in the same hole. Heat may kill the fungus in the ground. In Europe they dig quite a large hole and build a fire in it, and then fill the hole with new soil and plant another tree.

We must learn to destroy the spores in the orchard, and get rid of the germs of the various diseases of the root, fruit and leaves. Burn the leaves, remove the rubbish and keep your orchard clean.

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St. Louis, Mo., December 14, 1900.

Mr. L. A. Goodman, Kansas City, Mo.:

Dear Mr. Goodman:—

The experimental young apple trees planted last fall in cylinders with soil from Goodman, some with root pieces of apple, and some with diseased apple roots from Neosho were dug yesterday. The young trees with the oak roots had all been killed by the fungus, and about thirty per cent of the others. I think this shows that we are getting the fellow that is responsible for the trouble.

Truly yours,  
HERMAN VON SCHRENK.

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#### FOURTH SESSION.

*Evening Program:—Wednesday, December 5, 7 o'clock.*

"The Midship Mite".....Carleton College Quartette

Messrs. J. W. Hoy, Wm. Selzer, Arthur Hoy, D. D. Killam.

Educational Tendencies:

Prof. G. O. Nations, Farmington, Mo.

Instrumental Solo .....Miss Annie Wilson

GENTLE JOHNNY APPLESEED.

Recitation—"From Cornfield to River."

Miss Anna B. Chandler, Farmington, Mo.

Music by Baptist College Mandolin Club.

Messrs. Campbell, Byington, Mason, Barroll and Reeves, and  
Misses Wilson, Morris and Conway.

Edible and Poisonous Mushrooms and Toadstools.

(Lantern Illustrations.)

Dr. Wm. Trelease, Missouri Botanical Garden.

Selection.—

Mr. Robert Forsyth.

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## EDUCATIONAL TENDENCIES.

By Prof. G. O. Nations.

A good orchard requires a good nursery before it. Good people require good training of the children. Some one has said that in training children it is a pity we can not begin with their grandmothers. The mother has far greater opportunity to influence the child than has the teacher. The teacher has the child only seven hours a day, five days a week and may be thirty or forty weeks in the year. The mother has the child under her care for seventeen hours a day while it is attending school, and twenty-four hours a day for the 200 or more days in the year on which the child does not go to school. You will see that home training is necessary.

My subject is Educational Tendencies. I have two papers upon the subject, but I will not read either of them. I sometimes think it is refreshing to hear some one stand up and speak his mind. This has been a century of wonders, but there is nothing more wonderful than the progress of education. When we think of all the wonderful inventions and discoveries of this century you will see that this is a large statement. The greatest achievement of all modern history is the evolution of the people. The iron hand of despotism has been broken. The crowned head has given away to the mind and the will of the people. Our influence as a nation has crossed the ocean and is knocking at the

gates of despotism in the old world. One hundred years ago only a few had access to learning, most of the people were in ignorance. One hundred million pupils are now enrolled in the schools of Europe and America. There has been a wonderful revolution in the methods of teaching. The century has seen the birth of the normal school, a mighty engine of reform. There are 100,000 students in the normal schools, and 15,000 going forth every year from public and private normal schools to teach. The public schools have risen with the normal school. The normal schools have come to stay. Fifty years ago there was scarcely a work upon teaching; to-day the literature of teaching compares favorably with that of law or medicine. It is growing faster than the others. There are many magazines for teachers. Teachers themselves are sparing no pains to elevate their profession. This may be called the woman's century. Co-education is conquering the old institutions of learning and opening new ones. The future is secure to co-education.

There is another question that keeps coming up, that is compulsory attendance at school. The love of individual liberty is so universal that this is a hard question. Some of the ablest educators think the time is not far distant when compulsory education will be enforced. Our honest opinion is that compulsory education has a future; but I believe that before the close of the century we are about to begin there will be such a universal sentiment in favor of education that there will be no need of a compulsory law. The great wave of enlightenment will drive ignorance away.

Among the great educational improvements I might refer to the kindergarden. It is about as old as the normal school. There is a great tendency to integrate our schools. The school superintendent came first in the cities, but the country needs him too. One of the great reasons, for the movement of our population to the cities is the better facilities for education in the city than in the country. This is true, though some of the most eminent men of the country were educated in the log school house in the country. The spirit of the city is reaching the country. The country school will be graded, and will go upward one step after another. There will be uniformity in grading

all over the country, so that children may move from one district to another, from city to country, from one state to another and take the place they are entitled to in the new school without the loss of a term or two as now. We now have no supervision, but the time is coming when there will be paid supervision in every school district. We will have good high schools in rural communities, just as in the cities. There are much better opportunities for studying the objects of nature. Only in the last twenty years has the public high school come into vogue. In spite of all that has been done of every one hundred people that come into the world just six get into a high school; just one enters college. What a great field there is yet.

It has been only in recent years that teachers have been gathered into educational associations. I believe there ought to be such an association in St. Francois county. In some of the best counties the teachers meet every month. There are local associations, then county associations, district associations, then state, and above all the National Educational Association. Some papers read before the national association have almost revolutionized the methods of teaching.

There is a tendency to do away with many old practices and send the children to nature. The hand and the brain are trained together.

When we remember all the great things that have been done in this, we stand with great wonder as to what will be done in the next century.

GENTLE JOHNNY APPLESEED.

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A Monument to the Memory of a Penniless Philanthropist.—In Early Ohio Days He Went Through the Country Sowing Apple Seeds, and It Was He Who Started the State's Great Orchards.

From the Cleveland Leader.

Of all Ohio's quaint characters one of the most remarkable and at the same time most lovable was "Johnny Appleseed," by which name wonderful old John Chapman was known throughout the state years ago. He was the father of the orchards that have made the state famous for its apples, and if all he believed about the virtues of apples was true he was the father of much of the healthfulness which blesses the sons and daughters of the state. He believed that apples made people healthy and he gave to the early settlers of Ohio all the chance they had in the early days to get apples.

How well he is loved by the pioneers of the state is shown by the handsome monument to his memory that was unveiled at Mansfield last Thursday. Not many of those who knew "Johnny Appleseed" personally are alive now, but his work has lived after him to an extent that makes him the most remarkable penniless philanthropist the state ever knew. He was as poor as Job's turkey, but he gave to the pioneers of the state an endowment of apple trees.

Cleveland had a share in his penniless benevolence. for here and there about the city, notable in Newberg, are orchards which are pointed out by old residents as having been planted with trees that were once sprouts from other trees which had been raised by "Johnny Appleseed" and given to some pioneer of the early years of the century.

Mansfield seems to be the only city of the state that has recognized "Johnny Appleseed" and what he did for the state in his youth, for nowhere else, not even at his almost forgotten grave in Indiana is there a monument to him. The monument to his memory that was dedicated

in Mansfield last Thursday stands in the fine Sherman-Heineman park in that city, which was the joint gift of the late Senator Sherman and a wealthy fellow townsman. The monument was erected by Martin B. Bushnell of Mansfield, whose father was one of the pioneers of that part of the state and a personal friend of the quaint "Johnny Appleseed." The lower part of the monument, which is of buff stone, bears the inscription, "In the memory of John Chapman, best known as Johnny Appleseed, pioneer apple nurseryman of Richland county, from 1810 to 1830." The quaint man for whom the monument was erected was a hero as well as a crank, as he would have been called had he lived to-day. He roamed through the woods without anything in the shape of a weapon, despite the fact that the forests were thronged with Indians and wild animals that were almost equally hostile and bloodthirsty. Once he saved a settlement from the Indians by a thirty mill trip through the woods at night, a trip which was as fine in its way as Paul Revere's ride.

He was a fadist, a crank, perhaps, but at the same time he was an intelligent Christian man in ragged clothes, and no one who knew him, not even the children who were tempted to laugh at him, nor the Indians, whose companion he was on many a winter night in the forests of the state, could help but respect him. He could easily have turned his philanthropy into money, into enough money to have made a rich man among the pioneers, to whom the possession of a couple of thousand dollars meant independent wealth, but he did not care for money, he said.

"Johnny Appleseed" might very properly be called an apple missionary. He believed that apples were good for people, and he undertook to supply apples to the pioneers. His plan was as simple as his life, and his life was almost as simple as that of a squirrel or an Indian. He had no home, no money, and not much in the way of clothes. He would either go on foot or in a birch-bark canoe where there were streams that made it possible to go by water, across the line into the older settlements of Pennsylvania, where there were orchards. The pioneers who came to Ohio were too poor and it was too difficult to get themselves and their families into the new State for them to bring any young apple trees, and few of them had the patience to plant apple seeds and nurse



them to the point where they could be transplanted to form orchards. So there was scarcely an orchard worthy the name in the whole State. The quaint apple missionary saw this and realized how many years it would be before the struggling pioneers had time to plant orchards, even supposing they were able to buy trees to plant, and he devoted almost the whole of his life to giving orchards to the then scanty population of Ohio.

From the older portions of the older state of Pennsylvania he would bring back to Ohio bags filled with apple seeds. He got them at the cider mills of the Keystone state. Apple seeds were of no value to those who had apple trees, and in Pennsylvania no one thought of saving apple seeds. So "Johnny Appleseed" had no trouble in getting all the seeds he could carry back through the wilderness to Ohio. When he got to a part of the state where there were no apple trees he would plant the seeds he had brought. He had studied the matter until he was able to pick out the most favorable place to plant, so that they would be most protected from the winter blizzards and get most of the sunshine that their rapid growth required.

When he found the right spot he would clear away the trees and shrubs, plant as many seeds as he thought proper, and build a rude fence about his nursery in the wilderness. When he had done this, planting sufficient seed in each nursery to supply the farmers in that vicinity with young trees, he would go to another place and start another little grove. Thus he would continue until his supply of seeds was exhausted. Then he would either go back to Pennsylvania for more seeds or, when the trees he had planted were large enough, begin to distribute the saplings. When they were grown a few feet above the ground they were ready to be transplanted into the orchards of the pioneers. Sometimes "Johnny" sold the young trees for clothes, old shoes, or something else he could wear or use. More often he gave the young trees away, presenting to each of the pioneers enough trees to make a fairly large orchard. In this way he started almost innumerable orchards.

He carried on the work for years, and there are still many thousands of apple trees in the state that grew either from little trees raised by "Johnny Appleseed," or else from older trees that he raised. His

work supplied the state with apples many years sooner than the struggling pioneers would have done it without his quaint but beautiful benevolence.

It is said of him that he lived a life of almost inconceivable simplicity and gentleness. Innumerable anecdotes of him are told. One built to keep himself warm, he noticed that insects were being attracted to the fire by the light and were falling into it. Never to harm a living creature was one of his principles, and when he noticed that his fire was causing the death of some of God's creatures, as he called everything that had life, he put out his fire and spent the remainder of the night in cold and darkness. His life was full of such acts as this. He crawled into a hollow log one night to sleep, and when he found that there was a chipmunk and her family in the other end and that they were frightened by his presence, he went away and slept in the snow because he could not find another hollow log.

Living in the woods as he did when he was making his trips to and from Pennsylvania, he came to be an adept in woodcraft, and this may have had something to do with the high esteem in which he was held by the Indians, who never molested him. As he came from the places where he got his apple seeds, he used to stop and pay visits to the orchards he had created, seeming to have almost the regard for the trees that he would have for a pet animal.

He began his apple tree missionary work as early as 1802 or 1803. He was less than 30 years old then, and strong in limb, but far from good looking. He was born in Massachusetts in 1775, and came west with his brother in the first years of the century. First he began his apple missionary work in Western Pennsylvania, but that country was rather too well settled, and there were already too many apple orchards for his work to take just the beneficent character he aimed to give it. For twenty years he kept up this quaint work of philanthropy in Ohio. and then, this state having meanwhile been transformed from a wilderness to a farming country, he went on out west, and carried on his apple missionary enterprise in the still newer country.

"Johnny Appleseed" was tall and his black beard and hair were long and unkept. His eyes were small, piercing and clear; to his

last days he was remembered. He dressed in rags, often in what seemed less than enough to keep him warm. Usually he went barefooted, and often he tramped long distances through the snow with nothing on his feet. Sometimes he wore sandals made of pieces of wood or bark and fastened to his feet with thongs cut from the skins of animals. He was so welcome everywhere he was known that he needed no money for food or lodging and he literally "took no heed for the morrow." He carried no money, and when he was in the woods he lived, as the animals did, on what nuts, berries, roots and other food he could find. Whenever he went to a farmhouse he was supplied with whatever to eat or wear he needed, and sometimes he would be given enough food to take him to the next clearing.

He was almost as fond of children as he was of apples, and although his nervous, jerky way of talking amused them very much, they were too much awed by his odd appearance to let him see them laugh at him. He was always clothed in rags, not very many of them in summer, either. Often he wore on his head a tin stew pan that he used much to cook in. The settlers thought from what he had told them that a part of his peculiarity was due to his having been jilted by a fickle maiden. The story was that he had taken a poor orphan girl from the most meager surroundings, educated her, given her all the comforts he could command and then found that she was receiving the attentions of another young man. This must have been when he was a young man, for he was not known to be able to care for himself, to say nothing of anyone else, during the time he was in this part of the country. Although he did not talk much except about his beloved apple trees, he was eloquent when he talked of them, and he was fond of making grandiloquent addresses about the virtues of apples. At such times he had command of a very fine flow of language that indicated an excellent education.

After going further West, he came back to portions of this state from time to time to call on his old friends and his apple trees. The last time he returned to Ohio was in 1845 and that year he died. He had many relatives, his parents' family having been a large one, but little is known of any of them.

It is to this quaint, lovable character that M. B. Bushnell, a prominent citizen of Mansfield, raised and dedicated a monument which will make him better known, although there is little doubt that his gentle soul would care for no other monument than the hundreds of thousands of apple trees all over the state that have sprung from the seeds he brought through the woods from Pennsylvania.

It was during the war of 1812 that "Johnny" showed, more pronounced than ever before, perhaps, that there was the heart of a hero under his ragged shirt, a shirt which was never fastened at the throat, no matter how intense the cold. A rumor came to Mansfield that the little settlement was to be attacked and word was sent to as many people as could be reached, warning them to assemble in the blockhouse in the center of the square. There were no soldiers at the blockhouse, the nearest being at Mount Vernon, thirty miles away, where Captain Douglass had a troop. It was a terrible journey, for there was only a new, untraveled road through the forest, and the country was alive with hostile Indians. When volunteers to go to Mount Vernon were called for, "Johnny" stepped forward and said he would go. He did go, made the journey in safety, and brought back the troops with him in the morning, saving the settlement from whatever threatened it.

His death was as quaintly pathetic as his life. He loved the trees he planted as he might have loved children of his own. The last of his life was passed in the neighborhood of Fort Wayne, where, although a man of 72, he still planted apple seeds and raised trees for the benefit of the country. He heard that some cattle had demolished the fence of brushwood he had placed about a little cluster of trees he had planted, and although the place was twenty miles from where he lived, he started on foot to go to it and rebuild the fence.

All the score of miles to where his trees were he tramped. He worked for hours repairing the fence about the trees, so that it should not be broken down again by cattle, and then started for his home. It was a cold, snowy day, and on the way back the old man became so weak that he was compelled to stop at a settler's house and ask to be allowed to rest there. It chanced that he went to the house of a man who had lived in Ohio and who had known of "Johnny Appleseed" and his life

work of giving the state apple trees. He was very warmly welcomed, but would accept nothing but some bread and milk and permission to sleep on the floor. The next morning he was delirious with pneumonia, the result of the fatigue and exposure of his trip to save the trees he had planted, and in a short time he was dead. He was buried near where he died, and the rude headboard that was placed over his grave long ago rotted away, so that the exact location can only be guessed at.

## EDIBLE AND POISONOUS MUSHROOMS AND TOAD-STOOLS.

By William Trelease.



THE DEATH CUP.  
*Amanita Phalloides.*  
Chesnut, Farmers' Bulletin No. 86.

A number of years ago, while camping with a friend in the Rocky Mountains, I brought in from an afternoon's tramp several pounds of one of the less frequent puff-balls, *Mycenastrum Corium*, which did not show any discoloration or other signs of disintegration or advancing maturity, and which I proposed to cook for our supper; but my friend, who in all matters is a most cautious man, not only refused to partake of them but declined even to allow the use of the kitchen-outfit—which belonged to him—for their preparation. Ultimately he yielded so far as to allow me to cook the fungi in his frying pan on promise of a thorough disinfection before anything else should be cooked in it, but I was a subject for close observation for the next twenty-four hours or more.

In the eating of fungi, as in many other matters, people are, indeed, apt to run to extremes. Many persons, knowing that the news-

papers report a number of cases of toadstool poisoning every year, some of which result fatally, refuse absolutely to admit fungi of any description to their bill of fare, or, if they do not go so far as this, confine themselves to canned French mushrooms and the fresh cultivated mushrooms sold at a high price in the markets of most large cities.

On the other hand, the knowledge that only a few kinds of pleasantly flavored fungi are really and necessarily dangerous, and confidence in widely published but often untrustworthy rules for knowing them, lead some persons to gather and eat indiscriminately of most of the kinds that they find growing, at first speculating on this fact and afterwards knowing from experience that certain kinds, if only correctly recognized, are safe. It is from this class of people that the newspaper notices referred to usually derive their subjects, the law of chances rendering it probable that ultimately the wrong species will fall into the hands of the experimenter, who is then fortunate if it is only one of the moderately dangerous kinds that he has eaten and not one of the most deadly.

There have also been, for centuries, a few people who, starting with one or more commonly known and easily recognized edible species, have tested others with extreme caution, accurately noting their characters meantime, so as to become real authorities on the fleshy fungi, botanically as well as economically. This class of persons today is much more numerous than ever before, and a number of our larger cities possess "mycological clubs," composed of those whose interest in nature leads them to study the larger fungi and with many of whom it is something of a fad to have made one or more century runs on edible species—it I may use a bicyclist's phrase. As they are commonly cautious and observant, and carefully experiment with species that they have not eaten before, and as a knowledge of the obscure differences between edible and harmful species is more readily gained and transmitted by word of mouth in their field excursions than in any other manner, the members of these clubs rarely poison themselves or their families seriously, though they are usually looked upon with some terror by their friends of the laity, who are so often regaled with the last good, bad or

indifferent addition to the experimenter's accredited list that they rather dred an invitation to dinner in a mycophagist's house.

#### CAUTIONS.

Considered as a whole, the fleshy fungi are in reality safer and more wholesome as articles of human food than most persons believe, if eaten in moderation. I have known of a man dying from gorging on persimmons and bread, and the glutton is no safer in using even the best of fungi for this purpose than any other kind of food, while in case of the tougher species the danger from over-eating is even greater.

Ordinarily, worm-eaten or stale food of any description is discarded, and it is well known that fish, shell-fish, milk, etc., are liable to decomposition which may produce deadly ptomaines in them before any signs of putrifaction are evident to the senses. The fungi, many of which are especially attractive to certain classes of insects, and a number of which show to the eye the instability of some of their chemical components by a rapid discoloration after cutting or bruising, seem subject to similar decomposition, so that wormy or stale specimens should be discarded with the greatest care, even though they do not offend the sense of smell or taste, as they sometimes do, even after obviously deteriorated parts have been cut away. Common sense dictates the rejection of any kind of fungus which is peppery, acrid, or in any way offensive in smell or taste, though the expert sometimes finds that the pepperiness or acidity can be removed or the nauseousness disguised by suitable culinary treatment.

After rejecting everything dictated by common sense, however, there still remain a few but unfortunately common kinds of fungi that, appearing innocuous and even inviting, are in reality very dangerous. These the observant collector of fungi for the table need never be poisoned by, if he will observe a few simple arbitrary rules and act always on the principle of avoiding anything about which he entertains a doubt, leaving the solution of all doubts to specialists. What I propose to do, therefore, is to indicate, from the standpoint of conservatism, a few fungi which are capable of positive recognition, if collected with care,

and which are meritorious enough to make it worth while to gather them for the table, leaving all of those which might give rise to serious accident, and those the sole or chief merit of which is that they can be so prepared as to be edible, for the pronounced mycophagist.

#### A SELECTION OF WHOLESOME KINDS.

Foremost among the edible fungi stands the common mushroom, *Agaricus campestris*, well known as occurring singly, but often in approximated bunches, in open pastures in the early autumn, and a source of considerable profit to cultivators who have the necessary knowledge and skill to grow it successfully and who are convenient to a ready market,—for it is a crop that will bear little delay between the grower and the consumer. Two or three inches in diameter, smooth, white, creamy or slightly brownish, roundish-topped, short, thick and solid-stemmed with a membranous collar around the stem just about opposite the margin of the cap, and with gills which are at first pink and then turn brown, this inhabitant of open fields is not likely to be confused with anything dangerous, if these characters are closely observed; and to most people it represents the perfection of fungus flavor.

A number of varieties of this common mushroom are found either wild or in cultivation, and opinions differ as whether they should be called different species from it or not, but for the eater of fungi they are hardly separable, and they all have about the same very characteristic flavor when cooked. One marked form, however, the so-called summer mushroom, which Professor Peck has named *Agaricus subufescens*, and which several years ago came into prominence in the East as a profitable crop for cultivation, sometimes occurs in quantity in the vicinity of compost heaps and the like, and differs from *A. campestris* chiefly in having the cap browner and a little shingled, the stem more bulbously enlarged at the base and, like the thin ring, often mealy-looking, and the gills, which scarcely show a trace of pink, from a brownish white becoming dark brown.

In the fields and in manured borders, the horse mushroom, *Agaricus arvensis*, not infrequently occurs, and, though not always, is apt to



grow in somewhat irregular rings, suggestive of the more compact fairy-rings that I shall speak of later. This is usually of double the size of the common mushroom, and differs from it chiefly in having the gills, as in *A. subrufescens*, changing from nearly white to dark brown or almost black, and in having the large ring double, the outer or lower layer broken in something of a star shape. This mushroom, which, like the two already spoken of, has been successfully cultivated and yields large crops, is not unlike the common mushroom in flavor, though less delicate, and unless gathered and cooked very soon after the veil breaks, is apt to prove too dark when cooked to appear really attractive.

Another mushroom, similar to *arvensis* in its general appearance, and, like it, growing often in manured places, has been called *A. magnificus* by Professor Peck. It has also been cultivated, and for the table is if anything superior to the horse mushroom, and possesses a very decided flavor of anise.

In some localities another large mushroom, with the gills quickly turning brown and black from nearly white, and in aspect almost identical with the anise mushroom, is the macaroon mushroom, which has been called *Agaricus amygdalinus*, because of a very distinct and pleasing flavor of bitter almonds. For a number of years we have grown this in the mushroom houses at the Missouri Botanical Garden, and though, like all of these mushrooms of the *arvensis* set, the gills are apt to blacken the contents of the dish in chafing-dish and similar cookery, it is a species which, because of its peculiar and characteristic flavor, is highly esteemed by many people. To my own taste, however, none of them is quite equal to the *campestris*.

Persons who collect the common mushroom in pastures and fields frequently come across a very similar fungus, the gills of which, however, are pure white, becoming merely a little pinkish when bruised or in age, while the ring or collar is rather thicker and more persistent, and often lower on the stem. This, the *Agaricus* (or *Lepiota*) *naucinoïdes* of Peck, is the American representative of *Lepiota naucina* of Europe, from which it is usually considered scarcely distinguishable. It is generally esteemed for the table, and is perfectly safe, but the

greatest care must be exercised, in gathering it, not to confuse with it the death cup *Amanita* which sometimes grows in the fields with it, and which is the most deadly of the plants of temperate climates, but which may always be known by its *persistent white gills* larger, hanging, ruff-like collar, and by presence of a *sac or cup about the base* of the stem, which, however, being concealed by the grass or sunken in the ground, is likely to escape attention if not carefully looked for, and none but the most expert would distinguish this species from the edible *Lepiota* when in the button stage, before full expansion. Not long since, a correspondent wrote me in regard to a slight attack of poisoning experienced after chewing a small piece of a button of a white and, as he supposed, wholesome mushroom found in the fields, and to represent which he subsequently sent me unquestionable specimens of *Lepiota naucinoides*. What the button that he tasted may have been it is impossible to say, but it might have been the deadly *Amanita* except for the fact that it was acrid to the taste, a property which the *Amanita* does not usually possess. My advice, therefore in regard to *Lepiota naucinoides*, would be to refrain from eating it unless absolutely sure of it, because of the danger of collecting the death cup for it.

Frequently lawns and other grassy places are found to produce, in late summer or early autumn, large quantities of the shaggy-mane mushroom, *Coprinus comatus*, a white species the cap of which, instead of being broad, is in the shape of an elongated thimble a couple of inches in diameter, and the top of which is shaggy with often somewhat brownish or yellowish ragged scales detaching after the manner of hang-nails. The ring is thin and fragile, and the gills, which are at first white, rather quickly blacken and ultimately entirely deliquesce into an ink-like fluid. When young and fresh, and before any of this deliquescing is evident, this is one of the most delicate of fungi. Two other species of *Coprinus*, *C. atramentarius* and *C. micaceus* which are dingy grayish in color, and the latter of which is marked by somewhat glistening scales, suggestive of a sprinkling of mica dust, occur in dense bunches about dead or diseased orchard and shade trees, and, like the shaggy-mane, deliquesce into an ink-like fluid when old. Though decidedly inferior to the shaggy-mane, they also are much eaten, and

can not be mistaken for any poisonous species, though they should be used only when perfectly fresh and young.

*Lactarius deliciosus*, a somewhat funnel-shaped species without a collar, growing on the ground in woods, particularly in the North or at considerable elevation, and characterized by a brownish orange color, often with concentric darker zones, and by emitting drops of deep orange juice when broken, which soon changes to green, is considered an especial delicacy by those fortunate enough to find and know it, and there is no danger in its use, provided a minute bit of each specimen is tasted by the novice, to be sure that at most it is only slightly pungent.

*Russula virescens*, also a woodland species, and very common in this part of the country, with a roundish or flat top of a sage-green color, more or less netted with white by the breaking apart of the outer layer of the thin cap, and white, brittle gills tapering down onto the ringless stem as in *Lactarius*, and which does not emit a milk or fluid of any color when broken, is also greatly esteemed by those who know it, and is not likely to be mistaken for anything dangerous. The characteristic form of the *Russulas*, and their brittle gills, will enable anyone to recognize as *Russulas* a number of red-topped fungi of similar form to *R. virescens*, which are common over the entire country in woods in late summer or autumn. One of these, *Russula emetica*, is very acrid, and contains an alkaloid poison, but several of them are perfectly free from these principles, and, having a slightly nutty flavor, are greatly prized by the epicure mushroom eater. None but the expert can hope to know these edible species; but by adopting the precaution of tasting the least bit of each specimen gathered and rejecting all of those which are at all pepperty, these red-topped *Russulas*, and especially one of them which has yellowish gills, may be eaten with safety. Perhaps more than any of the fungi other than those belonging to the genus *Boletus*, these *Russulas* are subject to the attacks of insects, and, therefore, have to be split before acceptance for the kitchen.

The Chanterelle, *Ciantharellus cibarius*, of a bright yellow color, conical form, with low ridges instead of broad thin gills, no collar nor milk and a most delightful odor of apricots, suggests in form a *Russula* or *Lactarius*, although more hollowed at the top, and, like these, occurs

in the woods in abundance in some localities in the late summer, and is a great table delicacy, the only danger in collecting it coming from the fact that *C. aurantiacus*, which is of a deep orange color and usually slightly downy, is looked on with suspicion.

All of the above mushrooms are "Agarics," characterized by the occurrence of "gills," radiately placed about the stem on the under side of the cap, and all grow on the ground. A large number of mushroom-like plants, likewise growing on the ground, usually in the woods, have minute "pores" instead of gills—as though the under surface of the cap had been thrust full of closely placed needle holes. These, for the most part, belong to the genus *Boletus*, some species of which are wholesome while others are regarded with very great suspicion, either because of harmful substances actually produced by them or from the changes attending decomposition. Fungus eaters generally agree that those which at once have the top of the cap brown or fawn-colored and the pores or mouths of the tubes on the under surface greenish or yellowish, and which do not quickly discolor when broken open and possess no disagreeable taste, are harmless, though, more than any of the other fungi here referred to, the Boletuses should be experimented with in small quantity rather than eaten freely, and those with the pores reddish or differently colored at the mouth from within, or those which change color when bruised or broken, and, indeed, all those with a brightly colored reddish or lurid cap or stem, are best left to the mycological clubs.

*Strobilomyces strobilaceus*, a whitish *Boletus*-like plant with softly warty stem and the cap coarsely covered with gray or blackish shaggy tufts, and nearly white pores blackening or browning with age, is sometimes abundant in our woods in the autumn, and, though of peculiar flavor, is much liked by many people and can not be confounded with any injurious species.

In all of the *Boletus* forms, the entire mass on the under side of the cap, occupied by the pores, is apt to become slimy in cooking, and the stems, which, if not tough, are more often wormy than is usual in the *Agarics*, are rarely eaten, the solid flesh of the cap, therefore, being the part used.

Every person used to the country knows puff-balls, the different species of *Lycoperdon* and *Bovista*, which appear as soft fleshy balls or pear-shaped masses from an inch to a foot or more in diameter, and at first of a pure white color when broken, but with age turning yellow within and ultimately breaking up into a powdery mass which is then exposed to the winds. As a rule, the small puff-balls which grow on stumps or logs have a strong or fishy flavor and are not palatable, but those growing on the ground, if gathered before any sign of internal discoloration occurs, are to be commended for the table, and, in fact, any which are agreeable to the taste, if gathered young, and if *Amanita* "buttons" are not mistaken for them, are perfectly safe, and several of them, particularly the little *Bovista plumbea*, a nearly globose species about an inch in diameter, which frequently occurs abundantly in pastures, are delicious.

The Morels, *Morchella esculenta*, and *u. conica*, round—or conical-topped hollow grayish or creamy species, the enlarged head of which is honeycombed by deep coarse pits, are frequent in the spring in open woods, orchards and the like, and, although tough unless stewed very slowly, are of good flavor and perhaps more eaten with us than any other fungus, not even excepting the common mushroom.

Autumn brings many coral-like branching fungi, not at all like the mushroom and toadstools, growing in woods either on the ground or on stumps, and which are commonly of a white or creamy color, and if fresh and agreeable to the taste, perfectly safe food. The most beautiful of these and the largest are the coral fungi proper, *Hydnum coralloides* and *H. Caput-Medusae*, which are esteemed veritable delicacies.

#### LESS DESIRABLE KINDS.

All of the fungi so far recommended are not only safe but suitable to a person of epicurean tastes, if these run towards mushrooms. A number of others which are almost equally relished by fungus eaters, but which are apt to be tough, and hence less to my liking, are the following:

The fairy-ring fungus, *Marasmius oreades*, which occurs in distinct though sometimes broken rings a number of feet in diameter, in lawns.

each ring composed of dozens or hundreds of little brown mushrooms with a cap an inch or two in diameter bearing a few remote white or yellowish gills on its under side, and without a ring or collar on the perfectly smooth stem, is possessed of a flavor which to many people is very pleasing, and even those who do not care for it cooked in the ordinary ways like it as a seasoning material for other dishes, for which purpose they sometimes dry and powder it.

The parasol mushroom, *Agaricus (Lepiota) procerus*, with an elegant parasol-like cap about three inches in diameter, covered with brownish hang-nail-like scales and raised on a tall scaly stem a little thicker than a lead pencil and bearing a loose ring that may usually be slipped up and down on it, is likewise much esteemed. Like the last, it occurs on the ground, usually in open places. None but the most careless of persons could confuse with this white-gilled parasol the *Amanitas*, in which the ring is not movable on the stem, at the base of which is to be found either the sac-like cup already spoken of or a series of concentric scales or ridges more or less defined and replacing the cup, and which, instead of having hang-nail-like scales on the top of the cap, are either smooth or with the scales detached around their entire margin; but care should be taken not to make the fatal mistake of gathering these for the parasol fungus.

On diseased or dead elm, poplar and willow trees, the oyster fungi, *Agaricus* (or *Pleurotus*) *ostreatus*, *A. sapidus*, etc., of a creamy or smoky white color above, with white coarse gills, and characterized by being attached by one side instead of on a central stem, are often found in great abundance. Some people like them, but to be palatable they must be gathered when very young.

Frequent in autumn on decaying trees, etc., is the sulphur-yellow *Polyporus*, *P. sulphureus*, one of the bracket fungi, which resembles a *Boletus* in having pores on the under surface but is of tougher, almost corky substance when mature and, like the oyster fungi, is attached by one side in overlapping branches instead of being on a central or nearly central stem. With age, the upper surface becomes of a reddish color. When very young and quite tender, it is palatable but hardly a delicacy.

Now and then the beef-tongue or beefsteak fungus, *Fistulina Hepatica*, is said to occur in abundance, especially in the South, on stumps and logs. It has much the structure of the sulphur *Polyporus*, though the branches are larger and less crowded, and it is recognized by its red color and juice. When young, it is said to be very good for the table, and the juice cooked from it is esteemed as an addition to the platter gravy of a steak; but I have never myself had the opportunity to taste it.

#### UNWHOLESOME IF EDIBLE KINDS.

To the above lists, the first of which, only, suffices for my taste, many other edible species might be added, but for the most part they are such as not to be readily recognized, or they too closely resemble dangerous species, or else—and this pertains to most of them—they are at best capable of being treated by the cook as a vehicle for the administration of condiments, to which use, in my humble judgment, cheap animal food, such, for instance, as tripe, is better suited.

As has been said, very few fungi, when fresh and sound, are necessarily fatal or even very dangerous. Aside from slight derangement of the digestive apparatus which the tougher species are likely to induce in many people if they are eaten not in moderation, nausea and other discomfort, or even cholera morbus symptoms, may be caused by a number of species which are so obviously unpalatable that they ought not to be eaten, even though the cook may be able to remove or disguise their original character. Such, for instance, is one of the most abundant of autumnal stump fungi, the brightly colored *Agaricus* (or *Clitocybe*) *illudens*, which in form somewhat resembles the Chanterelle, and occurs in dense masses and may be recognized by its deep orange color, and gills which taper down onto the stem which is destitute of a ring; and the honey-colored *Agaricus* (or *Armillaria*) *melleus*, which likewise occurs on or about stumps or nearly dead or weak trees, the demise of which it greatly hastens, and which is of a yellow-brown color, a little scaly on top of the cap, and with a long scaly stalk provided with a rather wide collar near the top. Though prized by some people and of

only a slightly disagreeable taste when fresh, this is tough, and to my mind better left for those whose ambition is to have eaten a large number of species, than for those who really care for palatable fungus food.

## POISONOUS KINDS.

One very large white species, *Agaricus* (or *Lepiota*) *Morgani* which often grows in large fairy rings and differs from other *Agaries* in that the gills turn greenish from white, and the flesh of which soon discolors after being cut, is said to make many persons ill and has caused at least one death of a child, so that, though many appear to eat it with impunity, it should be avoided or tested in the most careful manner and never eaten to any excess. The peppery species of *Lactarius* and *Russula* have been spoken of already in a cautionary way, as have the red-pored and changeable-fleshed kinds of *Boletus*, and attention should be called to the fact that with the fairy-ring *Marasmius*, which has a smooth stem, sometimes occur two other kinds of *Marasmius* which have the stem downy or hairy at base, and in one of which the gills are numerous and crowded together, and which are not edible.

Though some of these, and many other discredited fungi, are in themselves doubtless injurious, the majority of them, if eaten, produce at most an effect which, painful though it may be, is not likely to be attended with serious danger except for very delicate persons or for children, but this possibility, and the fact that in decomposition their less poisonous contents sometimes change to more toxic alkaloids is sufficient to dictate the most rigid care to exclude them. Still, the necessarily very dangerous palatable toadstools appear to belong to the genus *Amanita*, which is characterized, so far as these species are concerned, by having the base of the stem either set in a membranous or somewhat fleshy cup (often out of sight among the grass, etc., from which the plants emerge, or in the ground), or surrounded by scaly ridges or rings, a cuff-like or ruff-like hanging collar, white gills, not changing either to pink, brown or black, and usually, but not always, loose scales or warts scattered over the top of the cap. That the genus *Amanitopsis*, which agrees with *Amanita* in its white gills and volva or



cup at the base, though it has no collar or ring of any description, is edible, and that in the genus *Amanita* the Royal Agaric, *Amanita Caesaria*, which has the stem and gills yellow, though it possesses both a cup and the hanging collar, is considered one of the greatest table delicacies, is no reason why anyone should experiment with these volva-bearing toadstools, and my advice is to leave them all severely alone.

#### THE DEADLY AMANITAS.

*Amanita muscaria*, the fly fungus, which in our vicinity fortunately is seldom seen, but which is the most noticeable fungus of northern and eastern woods, where it is abundant every year, is easily known by the red or yellow cap, varying extremely in brightness and shade and on the top of which are loose removable flocks or scales, the somewhat scaly or ringed swollen, base, white gills and evident collar. Its poisonous properties are said to come from an alkaloid, muscarine, which, usually a few hours after eating, causes dizziness, disturbance of vision, frequently cholera morbus symptoms, difficulty of breathing, sometimes insensibility, and so greatly retards the action of the heart as to, sometimes end in death. Emetics, for the removal of undigested parts of the fungus, and emollients and stimulants, such as a wine glass of sweet oil and whisky in equal parts, repeated once or twice, are the first home treatment, and the hypodermic injection of atropine, which is a heart stimulant, is the physicians' resort when called in to treat a case of muscarine poisoning—and it is the fly fungus which gives him nearly all of his patients of this sort.

More deadly still than the fly fungus, and unfortunately more likely to be confounded with the common mushroom and its allies, and still more likely to be confounded with the *Lepiota naucinoides*, is the death cup, *Amanita phalloides*, and its form or variety *A. verna*, which, usually of a white or brownish color and frequently but not always with a few loose scales on the top of the cap, is most clearly marked by its persistently white gills, large hanging collar, and the distinct (but often concealed) cup about the base of the stem. This fungus contains a most virulent albuminoid poison which has been called amanitin or

phallin, and which is comparable with snake venoms, the poison of castor beans and some toxic leguminous seeds like the rosary bean, and the toxins of diphtheria, cholera and some other germ diseases. Unlike muscarine, and other irritants and alkaloids, this does not usually make its presence known for ten or twelve hours after eating, by which time the fungus is usually completely digested and the poison absorbed. The symptoms, which are of the most pronounced cholera morbus type, frequently accompanied by cramps and convulsions, culminate in a rapid depletion of the red corpuscles of the blood, the disintegrated product of which passes into both the urine and intestinal discharges, coloring them red. It is laconically said by writers on this subject that "there is no known antidote to phallin."

#### A RULE OF SAFETY.

In resume of what I have said, I may repeat that the fungi listed above as wholesome need not be confounded with any necessarily deadly or even seriously deleterious species by an observant person, if, as should always be done, "buttons," or unexpanded young specimens, are avoided; and for all but experts the avoidance is to be urged of pungent or distasteful kinds, lurid or changeable-fleshed *Boleti*, green-spored *Agarics* and any species of the gilled fungi which passes either two of the following characteristics: *persistently white gills, a collar, or a cup at base of the stem*, since, though some unquestionably wholesome and palatable species (among them the *Lepiota naucinoides* and *L. procerus*, which may be learned and used later) would be thereby rejected, safety can thus be secured in the enjoyment of a sufficiently large number of kinds.

#### NUTRITIVE VALUE OF FUNGI.

I hope that I have made sufficiently clear my purpose to consider edible fungi rather in the nature of delicacies for the table than of necessities for the empty dinner pail, yet many writers on this subject attack it from the latter point of view, deploring the large amount of

"meat" that is allowed to go to waste each year under the eyes of the community, and particularly in the country, where fresh meat is often hard to obtain except by a draft on the chicken yard or the use of the rabbit trap, because of unfounded popular prejudice against "toadstools," as all of the fleshy-capped fungi except *Agaricus campestris* are usually called. Perhaps the justness of my position in distinctly advising against the use of species not in themselves delicacies may find further support in rather recent publication of the results of reanalyses of some edible fungi made by Mendel and others, who show that even of the five per cent. More or less, of the weight of an ordinary fungus which has commonly been passed by chemists as albuminoid and therefore seemingly nutritious nitrogen-bearing material, only approximately one-half is really albuminoid, and who state that of the Morel, for example, one would have to eat several kilos in order to obtain the daily requisite of 100 grams of proteid usually supplied in an average meat diet for an adult—approximately what would be necessary in an exclusive diet of either potatoes, peas or green corn.

#### BOOKS AND TESTS.

No brief paper, even if, like the present, of definitely limited purpose, can quite meet the demands of those who, having mastered its teachings, want to dip further into an attractive subject, either as a means of adding to the table, supplying the market or acquiring botanical information. I have therefore added a short list, including some of the more useful and excluding all of the more dangerous, of the publications on this subject, and I have marked in an intelligible manner a few of the works that should be first procured. Unfortunately, that which I should place first on my shelf, if starting a library of this kind, Gibson's "Our Edible Toadstools and Mushrooms," is an expensive book, but here, as in other cases, it proves difficult to get really desirable things without paying the market price for them. Except for cultural directions, foreign books have not been included; and I can not do better in closing than to urge that *all popular tests and all tests derived from the old books on edible fungi be most rigidly avoided* by those

who desire to know whether or not a given fungus is edible, the only safe basis being the accurate knowledge which comes from learning, species by species, a few kinds with which dangerous kinds can not be confounded, and above all the *wholesome fear of the genus Amanita* which Mr. Gibson has made the keynote of his book,—notwithstanding the occurrence in that genus of harmless as well as deadly species.

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## FIFTH SESSION.—December 6, 9 A. M.

Opening Prayer: Rev. John Garton.

The discussion of the root rot and root knot was taken up and continued until the business of the society was taken up.

The discussion of root rot was resumed. Mr. Von Schrenk repeated his advice against replanting trees when they have died with root rot. It is difficult to treat the soil to kill fungus growth. The water in the soil is charged with carbonic acid gas which soon neutralizes the strength of the Bordeaux mixture in the soil.

C. W. Murtfeldt.—I like the idea of the scientist looking into the root of the matter; but we do not care how to establish these things. We want to know how to stop them, to remedy them. It wont do for the farmer to experiment. He can not afford to waste his time and means in this way. He needs them for better things. Thirty years ago it was known that replanted orchards were failures. If you burn out the place you injure the soil by burning out the humus or vegetable matter in the ground. We don't wish to experiment. Let the Experiment Station do that.

Mr. Von Schrenk.—From what I have seen of trees affected with root rot it's only a few months after the trouble is noticed till the tree is dead. What is the difficulty? One tree in Mr. Goodman's orchard had some forty apples on it while below it was badly affected. If a disease attacks any part of a tree above ground we see it, but this is more difficult. We can look at the trees in the spring and see by the large number of flowers on them that something is wrong. In nine times out of ten these trees had lost their larger roots and were weakly supported by surface roots. In the majority of cases you will find no evidence of disease till the tree is almost actually dead. This is also true of forest trees. We sometimes find trees dying from root rot on prairie soil, but it is a different thing from the one I refer to now. It is sometimes found in soil long cultivated.

Mr. Stanton, Illinois.—In Illinois we have root rot always on timber land, though it may have been cleared for a number of years before the trees were planted. Within the last few years it has been found in prairie soil. When the condition of the prairie ground becomes the same as that of the timber filled with woody fibers from dead roots of trees we may expect root rot there as well as on timber land.

Mr. Von Schrenk.—I am asked what effect lime has upon this rot. Lime did not save Mr. Goodman's trees.

A. Nelson.—I think wooly aphids causes root rot, and lime and ashes tend to keep the aphids down.

Mr. Von Shrenk.—Many trees die from other causes than this of which we are talking. The fungus found on the dead tree may not

be the cause of its death. It may have grown after the tree was dead. The tree dies and the roots rot; but this fungus attacks living trees.

Mr. Chandler, Kansas.—Re-set with peach where apple trees die.

Mr. Von Schrenk.—Peach trees planted in the holes from which dead apple trees have been removed may do well. Speaking of root gall; my personal opinion is root gall is far more serious than root rot. This gall is found from Ohio to California. It is serious with the almond growers of California. It occurs upon many kinds of fruit. Root gall is very easily propagated through the soil. I think the society should declare it as dangerous as the aphid or any other disease. It can be communicated from one tree to another through the ground. It is a disease very much to be feared. They should be burned as fast as found. It will take in the place where the graft is set or any other place. I can compare it to club root in the cabbage. You know it is not safe to plant a crop of cabbage on ground where club root has previously been. Take care not to get this gall into the orchard.

Question.—Is the pear affected with the same root rot as the apple?

Mr. Von Schrenk.—So far as I know it may grow on the Kieffer. North of the Missouri river it is not so bad. It extends to the other Mississippi Valley states. Where the black oak grows you might expect to find it.

Mr. Tippin.—I am a crank upon this subject: I think the best thing we can do is to accept conditions as they are. The law of death applies to all living things, human life or tree life. I think it is best to study how to have a healthy tree. If the tree dies from any cause the root will rot and return to dust. We are trying to grow apple trees in a latitude not suited to them. In Texas there is always something the matter with apple trees. As you come north the conditions become less unfavorable. In New York trees may be found one hundred years old.

W. F. Hoy.—Pear trees planted in the holes from which apple trees died with root rot were removed are all right.

E. A. Riehl had root rot on Ben Davis apple trees, took the



apple trees out; replanted with pear trees; had no root rot on the pear trees.

Mr. Perrine.—We all admit a vigorous tree is less subject to disease; but root rot takes the most vigorous trees in the orchard in almost every instance. It seems to be found only in certain sections of the orchard. We have bearing trees in the timber. It took every tree in some sections of the orchard.

Mr. Butterfield.—My observation in thirty years in Missouri is that many orchards are found, upon land that never can grow an orchard, all over this country. I think when we quit planting orchards upon land not fit for an orchard, we will succeed. You will find root rot upon land not fit for an orchard. Whenever you show me root rot I think I can show you land unfit for an orchard.

Sam. Miller.—I have neither root rot nor aphids.

Mr. Tippen.—I will pay five dollars for every tree you can kill by burying the spores of root rot around it, if you give me a healthy young tree and let me select the soil upon which to plant it.

The President of the St. Francois county horticultural society invited the members and visitors of the State society to visit the mines of the county. The local society furnished free conveyance.

The secretary read a letter from B. T. Galloway, Chief of the division of vegetable physiology and pathology urging that the wish of the society be expressed for the granting by Congress of the increase in funds requested by the Secretary of Agriculture for the purpose of extending the work and investigations of the division of pomology and vegetable physiology and pathology.

A motion was made and carried that a committee be appointed to consider the letter and report later.

The chair named as members of that committee, J. C. Evans, J. C. Whitten, and C. C. Bell.

At the introduction of the subject of the Pan-American Exposition, suggestions were made for having a special car to carry western delegates to Buffalo and through the orchard districts of Michigan, New York and Ohio.

The motion was carried that a committee be named to take up the

plans for such a trip.

The committee appointed was, J. M. Irvine, A. Nelson, W. R. Wilkinson.

Resolutions on Food Adulteration were presented by G. A. Atwood.

Whereas, the adulteration of food, drink and drug products has assumed alarming proportions to the very great detriment of the health prosperity and to the honor of the country, therefore, be it

*Resolved*, By the Missouri State Horticultural Society that we request our State Legislature and the National Congress to enact laws that will correct the above evils.

*Resolved*, The Secretary of this Society is requested to transmit a copy of these resolutions to the presiding officers of the two branches of the State Legislature and of Congress for presentation to the above assemblies.

The resolutions were adopted by motion.

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## MISSOURI AT THE PAN-AMERICAN EXPOSITION.

Following is Mr. A. Nelson's response to the toast, "Missouri at the Pan-American Exposition," on the occasion of the 11th annual Henry Shaw banquet to gardeners and florists, a report of which appeared in the *Rural World* of November 14:

Mr. Toastmaster: To respond to this toast under different conditions would be a pleasant duty, but you know that to put Missouri at the Pan-American Exposition means more than responding to toasts. To put our imperial Missouri at that great exposition means an appropriation from our State of not less than \$50,000, and it should be even more than that. Missouri will not be at the Pan-American under a cloud as she was at Omaha and as she is now and has been at the Paris Exposition. All the money for expenses to carry on the exhibit at Omaha was begged from individuals

and corporations and for the Paris exhibit from private individuals. This class of noble men begin to get tired, and to put the burden where it belongs. Missouri's governor and law-makers must come to the front and make an appropriation sufficient to make an exhibit that will be a credit to our state and not a discredit in some lines, as at Omaha. Why, do you know that had it not been for courtesies extended to Missouri from New York, Minnesota, Kansas and Nebraska we would not have had a spot or place for the wives, mothers and daughters of Missouri to rest themselves? I speak these facts now to you that you may know for yourselves. Shall Missouri, with her great wealth, her great resources from her orchards, fields, forests, mines and her manufacturing interests, shall Missouri, the fifth state in the Union, go to the great Pan-American Exposition next year as a pauper? I for one, though not a Missourian by birth, only by adoption, say no, ten times no. As business men, looking ahead to 1903, we must go to the Pan-American Exposition as this great state should go; we must go to show to the world what they may expect and look forward to here in this magnificent city and state in 1903. I am, Mr. Chairman, deeply in earnest in this matter, for if I go to Pan-American Exposition as commissioner of one of Missouri's first industries, I must go there to carry out what we the fruit growers have started to do, that is to capture the gold medals with Missouri's fruit against all comers, my native state included; and I assure you when I show you what we propose to do it with and what has been done by the noble horticulturists of Missouri, then you may know something of what the commission has done and proposes to do.

Mr. Chairman, were it possible to introduce here this evening some of the noted people of this or foreign lands, we would be satisfied with a bow of recognition, especially if that notable was a lady. I now propose to introduce to you the Queen of the Ozarks, and with her will be others of note to which I hope a bow of recognition will be satisfactory. (A large dish of handsome apples was here displayed to the audience.)

Now to the work of the Pan-American commission. Governor Stephens appointed fourteen gentlemen from different walks in life as

commissioners to represent Missouri at the Pan-American Exposition. These fourteen commissioners met in St. Louis and elected officers. Hon. A. C. Cochran, general solicitor of the Missouri Pacific Railway system, president; Robert M. Yost of your city, secretary. After that meeting the Governor made four more appointments, I being one of the number. Since my appointment the commissioners have held three meetings in St. Louis and made some progress. Hon. C. C. Bell of Boonville was selected Commissioner of Agriculture; Levi Chubbuck, Commissioner of Dairying; C. Roach of Carthage, Commissioner of Mines and Mining, and Bryan Snyder, Commissioner of Transportation. Thus far not a penny to meet expenses only as each one goes to his own pocket for it. To carry on my work I had hoped to get some funds outside, but thus far have failed. I do not know what other commissioners have done; I speak now for my work. I have made one trip to Kansas City, three to St. Louis and one to Buffalo, and in one of your cold storage plants in this city there are now 150 barrels of such apples as the world never saw before, a sample of which is now before you. This work thus far has cost me in round numbers \$1,000. No state money but plenty of state pride and patriotism.

You ask me will this fruit go on exhibition? Yes, and no; yes, if the great State of Missouri makes a suitable appropriation for this and other exhibits from our state. Mr. L. A. Goodman, the able and worthy secretary of our State Horticultural Society, made a call to the fruit growers for apples for the Pan-American Exposition to the extent of 200 barrels. Knowing that the fruit growers of the State had been called upon so often to donate fruit for such purposes, I was fearful of a great shortage as a result of Mr. Goodman's call, so took advantage of the opportunity of selecting the cream from the 17,000 barrels we packed this fall. And that is how we succeeded in putting up the 150 barrels spoken of.

Mr. Chairman, I hope, from the bottom of my heart, that Missourians will be able to go to the Pan-American Exposition and hold up their heads with the representatives of Illinois, Iowa and Kansas. This should be a matter of state pride; this should be a matter of interest to the grand men who stand at the head of the great World's Fair and

Exposition to be held in St. Louis in 1903. All Missourians are interested alike in this movement. On my trip to Buffalo, N. Y., to secure space for our fruit exhibit (one of the best in the Horticultural Building), I received many pleasant words from the officers and promoters of the Pan-American Exposition. I had the pleasure of meeting many of my former friends and business associates and found them deeply interested in their enterprise as well as in that of Missouri for 1903. And I want to say here and now, that we can not afford to let this splendid opportunity go by of showing to the world the great possibilities here in the imperial State of Missouri, to-day the fifth State in the Union, and no valid reason why she should not stand third. Mr. Chairman, we are met here to-night at the close of a warmly contested political campaign. We are all more or less partisans though I trust friends, and when the battle is over next Tuesday night let us forget our partisanship but do not let us forget that we are Missourians, standing up for her under any and all circumstances, and all will be well.

#### REMARKS.

C. C. Bell.—I want to say that I indorse every word of what Mr. Nelson has said and read. The great State of Missouri can do nothing else except to be well represented at the Buffalo exposition next year in that we want a return of the compliment in 1903.

Mr. Atwood suggested that the officers of the society go to the Legislature and urge the importance of this matter.

Mr. Nelson.—Some of us have determined that we will not beg of individuals or business firms money to make a State exhibit. If the Legislature makes an appropriation it can be done.

J. C. Evans.—I suggest that every member and friend of this society consider himself a committee of one to push this matter on the members of the Legislature. See your representative and Senator and say to them we must have this appropriation, not a little one but a great big one. If every one will do this we will have influenced a large majority of the members of the Legislature.

Mr. Nelson.—I want to say that I have seen our Governor elect Mr. Dockery, I called upon him and he pledged himself to use his best efforts to have a suitable appropriation made; but he is only one man. When the commissioner from New York, Mr. John B. Weber was in St. Louis he met Mr. Dockery, Ex-Governors D. R. Francis and W. J. Stone. These three leaders pledged themselves to work for an appropriation; but they are only three men, though strong ones. We want the influence of every member of this society exerted upon his Senator and Representative.

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## SECRETARY'S REPORT, AT FARMINGTON, MISSOURI,

December 7, 1900.

Ten years ago our society met in Southeast Missouri in the town of Poplar Bluff. It has been hard, seemingly, to awaken an interest in horticulture in this part of the State. When Farmington was suggested as the place for our annual meeting, the idea seemed to dawn on some of our minds that there are untold thousands of acres of the best fruit lands down here that need attention.

We are agreeably surprised to find such a beautiful body of land in this St. Francois county. The lands all have the peculiar red color of the Ozark region and are not covered with stone as are many other lands in this region. I have examined the lands closely and find that some of them have this red subsoil for a depth of several feet. This peculiarity is a very valuable one to the fruit growers and its value is fully shown by the wonderful growth of the hickory, walnut, sugar maple and elm in and about the city of Farmington.

The first item of importance that I wish continually to keep before the members of this society is the importance of more knowledge in our business. We must know more of our work and of what we want to do. Study of our interests in its minutest details must be our watchword. This knowledge is all about us somewhere, this information is locked up

in nature somewhere, these secrets are all about us on every hand, the keys to open some of them have been found and this information spread out for us to use, and yet there lies before us such an endless lot of knowledge that we know nothing about, that we are often dazed by this lack of information which is just beyond our reach, at present. It is still like the old farmer who said "Who know a heap" "but what we do not know would make more books than a mule could pull."

Besides this knowledge wanted in our work and our needs, I ask myself often if we really do use the advantages we have at our doors to the best of our ability. Do you study the advantages of your own? Do you stop and reason out what will be the result if you do this thing or that thing? Do you modify your plans in accord with this reasoning? Do you see things, test things, make experiments, and then draw conclusions from what you see and know? This is science. You would be establishing a *horticultural science* if you did these things. Do you utilize these advantages, I say, that you have ever present before you? If not, then why should you complain when you find failure as a result, or why should you grumble when you find this wonderful knowledge on the wings of the wind escaping your elusive grasp.

One other feature in this line of thought and that is adaptability. How often we blunder when we neglect this great feature, this important factor in business. There is no business with which I am acquainted in which this great subject of adaptability is so important, so necessary, so absolutely essential to success as in the horticultural line. Plant your peach trees on low land and too often we see failure. Plant your apple trees on the hard pan soil and disappointment follows. Plant oranges, figs, or foreign grapes here in Missouri and you know the consequences.

In the same manner but to a smaller degree do we see the planting of some of the fruits in our State.

Study adaptability and do not make the mistake so many have made by planting varieties not adapted to your locality.

Illustration, the nurseryman in making his selection of location.

Importance of our industry is now being felt more and more and we do not have to stop and explain to-day to the general public what horticulture means. The wonderful studies of our apple products ap-

ples by the 100,000 barrels, evaporated apples by the car loads, vinegar enough to supply all the sour people, apple cider for all who are thirsty. Berries by bushels, tons, car loads, so that none need go without, grapes without stint to all lovers. Flowers for the poor and the rich, the sick, the dead. In every yard and house and park and cemetery. Nurseries growing in number and importance; growing trees of all kinds by the thousands and millions. Landscape gardening and home planting, how best to plant, what to plant and when to plant. Cars of them for the best growth and development. All these give to our people an idea of the horticultural interests of our State.

Difficulties. Sure there are many, many, many, but there could be no honor or reward or development of our manhood if there were none. It takes these obstacles of life to make men. No man could be strong without exercise. So no man can become efficient without some practical experience in overcoming all these. The only blunder I think is in grasping these difficulties in time and getting rid of them.

But what a wonderful opportunity this offers us for study; study, development of our minds, our reasoning faculties, our hearts as well as our bodies, and thus become fully rounded out mentally and physically.

Conditions of 1900. The growth of the orchards during the past year has been a very favorable one. After the extreme winter of '99 we found many trees in bad condition but the summer of 1900 has helped many of our trees to recover the severe shock and are now on their way to recovery. It was a good thing that the trees did not bear many apples this year for they could not hold them. Is it not probable that some of our fungi have been doing us the more damage because of this loss of vitality? Such diseases as the scab or bitter rot for instance?

One of our best fruit growers tells me, he is not afraid his trees will not bear enough, he is only afraid they will bear *too much*. We have to fight and that continually the borer in our trees, the aphid on the roots, the codling moth in the fruit, *three injurious insects*.

We have to guard against the blight on the trees, the root rot on the roots, the bitter rot on the fruit, *three injurious fungi*.

The Root Knot. Again I wish to caution our tree planters and especially our nurserymen against this disease. If you have not



noticed it you had better look out for it is sure death to the tree and that right speedily. The trees will never live to even bear and in many cases it is worse than the root rot. I show you samples of this on several young nursery trees and on several trees three, four and five years planted and you can see that it is sure death.

The Birds. The bird law should be enforced by every farmer and fruit grower, by every lover of nature and life, by every school teacher in our schools, by every boy on the streets, by every family of our cities, by every dweller of the country. Protection for the birds should be preached from every church, in every school room, by all the women's clubs, by every social organization, and by every hunter of the land, if we ever expect to fight our insects successfully. Now that we have a National Bird law we should see to it that our birds are protected. We should have as much money spent by our nation and by our states in the propagation and protection, and disseminating our birds as is spent in our fisheries, nay more, for one is only food while the other protects food a thousand times more valuable than themselves. We can not say too much, we can not do too much, we can not be too earnest, in any way, in all ways, in every way in thus protecting our feathered songsters.

We have no game birds any more and the shooting of all birds should be entirely and absolutely prohibited. It is one of the works of this Society to keep this before the people and in every way help to educate them to this idea of protection of all our birds.

Our work continues to be one of advice, instruction, information, direction and location of the many new comers to our State, and the assistance of the many new fruit growers. The question of varieties, pruning, cultivation, spraying and marketing will give us all enough to do for the next ten years at least.

Our work at Paris has been a grand work, undertaken by this Society alone and without a dollar of help from the State outside of the little money we had saved from our annual appropriation or from money we had earned at other displays. It is because we have a few men scattered all over the State who have been willing to give of their time for the honor of the State and our State Society in particular. All

honor and credit to the many who have so gladly stepped into the work and carried it to a successful issue.

Following is the list of counties sending fruit to Paris :

Adair.	Holt.	Newton.
Boone.	Howell.	Platt.
Barry.	Jackson.	Ray.
Crawford.	Laclede.	Randolph.
Clay.	Lawrence.	Webster.
Dent.	Mercer.	Wright.
Greene.	Morgan.	

List of persons who furnished fruit for Paris Exhibit :

Ray County Horticultural Society, Richmond.

M. F. Berry, Hallsville.

W. M. Pearson, Mexico.

D. R. Edwards, Versailles.

G. L. Hillhouse, Pierce City.

W. M. Robarts, Republic.

Jones & Pinnel, Cuba.

G. G. James, Exeter.

H. R. Wayman, Princeton.

J. Roschi, Neosho.

J. E. May, Wilson.

A. Nelson, Lebanon.

J. C. Evans, Harlem.

L. A. Goodman, Westport.

O. S. Roush, Salem.

P. Weller, Salem.

L. B. Woodside, Salem.

W. T. Flournoy, Marionville.

C. F. Mount, Mt. View.

W. A. Gardner, West Plains.

Webster County Horticultural Society.

J. A. Nelson, Marshfield.  
Theo. Boss, White Church.  
G. L. Sessen, West Plains.  
T. E. Malone, Wilson.  
L. D. Gunning, Brashear.  
Frank Bailey, Wilson.  
C. A. Wood, Brashear.  
T. M. Hank, Brashear.  
J. S. Wilson, Wilson.  
G. A. Stone, Richmond.  
Missouri State Horticultural Society.  
Olden Fruit Company, Olden.  
N. F. Nursery, Oregon.  
D. A. Robnett, Columbia.  
John Pearman, Salem.  
A. Shirley, Salem.  
J. L. Lucas, Salem.  
Mrs. J. Maze, Salem.  
J. M. Spodden, Salem.  
M. F. Brown, Salem.  
B. Washington, Stone Hill.  
F. H. Robberson, Purdy.  
J. M. Harmer, West Plains.  
B. C. Woodrome, West Plains.  
Trimbell, McGill & Co., Seymour.  
J. N. Bailey, Mt. Grove.  
W. G. Gano, Parkville.

Mr. Gano spent a month in collecting about fifty barrels of apples for this Paris display, and they were the best the State afforded, as the results fully testify.

Fruit sent on first shipment of 1900.—Apples.

Olden Fruit Co., Olden, Mo.

N. F. Murray, Oregon, Mo.

Ozark Orchard Co., Goodman, Mo.

Fruit sent on second shipment of 1900.—Apples.

Ira Neff, Marionville.

W. P. Keith, Mayville.

D. R. Edwards, Versailles.

D. A. Robnett, Columbia.

G. A. Stone, Richmond.

W. G. Gano, Parkville.

L. A. Goodman, Goodman.

G. L. Sessen, West Plains.

Total of eight barrels and one box.

We have just had the last report from Paris about the Missouri fruit and at the last exhibit we were awarded two first prizes. One on 1899 fruit—one on 1900 fruit. Making altogether thirteen first prizes, and these thirteen prizes more than entitle us to an award of a grand prize of which four will be awarded on fruits, one each to Missouri, Illinois, New York and California.

This exhibit has been of great value to Missouri Orchardists for they already are asking from nearly every foreign country about our apples.

The following extract from the letter just received from G. B. Brackett U. S. Pomologist at Paris will give his idea of the display:

“The display was the largest made during the season and with very few exceptions the fruit was of high quality.

The exhibit of fresh fruit in the American Section has been maintained without a break from May 9, to the close of the Exposition, thus demonstrating the ability of the fruit growers of the United States to furnish European consumers an unbroken supply of choice fruits throughout the year. During the closing weeks of the Exposition the American Section has been crowded with interested visitors at all hours of the day and many inquiries for addresses of dealers in apples, oranges and pecans have been received.”

We have had at that exhibit 73 barrels of 1899 apples gathered in October, held in cold storage by the Armour Packing Company free of

charge until March and then shipped direct to Paris from Kansas City in cold storage. This lot was about one-fourth of the fruit sent from the United States. These apples were all repacked at Kansas City in March and every specimen double wrapped. They arrived in splendid condition and some of them were on the tables on November 1st of 1900 in good condition, thus showing what good fruit well handled and properly held in cold storage will do.

This fall of 1900 we sent over about 17 barrels by express and they too arrived in splendid condition and were a great advertisement for our State in the apple line.

Five exhibits were made each month during the six months, thus making twelve competition exhibits. At each one of these we were awarded a first prize, and at the last exhibit two first-prizes, and one grand prize. Making a total of thirteen gold medals and one grand prize.

#### PRIZES AWARDED.

Following is the outline of the work; collection of apples in fall of 1899 as reported in 1899 report:

Apples repacked in March and sent to New York from Kansas City in special car with train load of meat from Armour Packing Company. Shipped on steamer St. Paul in cold storage March 14, 1900. Arrived at Havre France and put in cold storage March 29.

May 14 and 29, temporary exhibit, a first prize at each exhibit.

June 12 and 27, temporary exhibit, awarded a first prize at each.

July 14 and 28, a first prize at each.

August 13 and 23, a first prize at each.

September 12, shipped apples by express.

September 13, a first prize awarded on old apples.

September 26, shipped 9 barrels by express.

September 28, a first prize on old and new apples.

October 7, awarded first prize on old and new apples.

October 27, a first prize on old apples and a first prize on apples of 1900.

## THE BUFFALO EXHIBIT.

Now again are we confronted with an exhibit on hand and no money to make it. Our treasurer, Mr. Nelson has been appointed Commissioner and in his usual energetic manner has made a grand collection of apples for this purpose. It takes work to do this thing and if you have never attempted it, try it once so that you may know how to appreciate the labor of making a collection of apples of 200 barrels. He has in storage as you have heard 150 barrels in St. Louis and the society has at Armour Storage Company at Kansas City over 50 barrels more now being kept by them free of charge for this society. It is well that we have good friends on all hands or we might fail in some of these matters. I append their letter offering us free storage in answer to my application to them.

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Kansas City, Mo., October 5, 1900.

Mr. L. A. Goodman, Secretary Missouri State Horticultural Society,  
Westport, Mo.:

Dear Sir:

We are in receipt of your esteemed favor of the second. Have instructed our boys in the cooler to give your fruit special attention. We want to be able to turn your stock out next year in a condition that will reflect credit upon our cold storage.

Yours truly,

Armour Packing Company,  
per W. J. Murray.

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Kansas City, Mo., September 25, 1900.

Mr. L. A. Goodman, City,

Dear Sir:

We received Saturday one barrel of apples marked "For Exhibit," which we have stored for your account without any charge. If the Horticultural Society of Missouri wishes to place any fruit with us this year for exhibit purposes, we will be glad to accommodate you with the space for 150 barrels without charge.

Yours truly,

Armour Packing Company,  
Per W. J. Murray.

Apples have been sent for the Buffalo Exhibit by the following persons:

A. Nelson, Lebanon.  
Agricultural College, Columbia.  
J. S. Atwood, Carrollton.  
Conrad Aul, Smithville.  
R. E. Bailey, Fulton.  
W. S. Crouch, Carrollton.  
J. C. Evans, Olden.  
W. T. Flournoy, Marionville.  
A. H. Gilkeson, Warrensburg.  
W. H. Ghormley, Greenwood.  
J. H. Jenkins, Sapp.  
Leake Bros., Orrick.  
J. H. Marion, Fulton.  
E. W. McCoy, Utica.  
F. M. Merritt, Pilot Grove.  
N. F. Murray, Oregon.  
Ira Neff, Marionville.  
Ozark Orchard Co., Goodman.  
D. A. Robnett, Columbia.  
J. T. Snodgrass, West Plains.  
Zeitinger & Bros., Zeitonia.  
F. H. Speakman, Neosho.  
J. T. Stinson, Mt. Grove.  
Conrad Hartzel, St. Joseph.  
E. A. Sylvester, Osborne.  
G. T. Tippin, Springfield.  
C. C. Crane, Aurora Springs.  
Tippin & Moore, Mt. Grove.  
L. S. Witmer, Seymour.  
J. C. Whitten, Columbia.  
C. H. Williamson, Skidmore.  
H. B. Francis, Mulberry.  
M. Butterfield, Farmington.

H. W. Cook, Potosi.  
 Olden Fruit Co., Olden.  
 L. A. Goodman, Westport.  
 L. V. Dix, Jefferson City.  
 W. R. Wilkinson, Altenburg.  
 S. H. Leathe, Mine LaMotte.  
 E. J. Jones, Hazle Run.  
 D. M. Hulen, Hallsville.  
 M. F. Berry, Hallsville.  
 Wm. F. Hoy, Farmington.  
 W. G. Gano, Parkville.

Following is the list of counties represented at Buffalo exhibit.

Boone.	Franklin.	Miller.
Bates.	Green.	Newton.
Buchanan.	Holt.	Platte.
Callaway.	Howell.	Pulaski.
Carroll.	Jackson.	Perry.
Cooper.	Johnson.	St. Francois.
Cole.	Laclede.	Webster.
Clay.	Lawrence.	Wright.
Crawford.	Livingston.	Wayne.
DeKalb.	Madison.	Washington
Dent.	McDonald.	32 counties.

This list will be completed and also the list of those furnishing the fruit just so far as can be done at this meeting.

The importance of these exhibits is hardly realized by most people, but the results are legion. Other states see the benefits, and we will be as foolish as a merchant who does not advertise his business and yet complains because his affairs are growing less, if we do not take advantage of this opportunity. It has come to this pass in all business affairs, in all political affairs, in all church affairs, in all state affairs, the one who "hustles" for business gets it. This society would be held responsible for any failure made in securing a display to any of our grand



expositions and it is, must be and will be part of our business ever in the future to maintain the honor and glory of our State.

The St. Louis World's Fair can not even be outlined but in 1902, if a crop year we will again prepare fruit for a display and in 1903 we will furnish fruits for the display during the whole of the summer. We do not fear that you will not assist in this also.

**A Pure Food Law.**—It seems to me if properly framed is one of the most important measures to come before our people for consideration. As one is now coming up before the present Congress we should see that it has our support.

Conclusion of this whole matter—do you think there is enough for this society to do? Has some work or study been outlined to you to show that we are just beginning to study all these important topics, are there not untold questions yet to settle? Are there no foes yet to destroy? Are there no friends yet to make? Have you seen fields still open for study, thought, investigation, settlement? Young and old, high or low, rich or poor, educated or ignorant, every one who loves horticulture can and does have an untold field for investigation until we can make horticulture a science in the truest sense of the word.

L. A. GOODMAN, Secretary.

## REPORT OF TREASURER A. NELSON, LEBANON, MO., Dec. 6, 1900.

I am glad to be able to report to you such a prosperous condition of our finances. While we have been well treated by our State in all its appropriations, yet we have been all this time doing something for ourselves also; and we have taken part of this fund of our own making and put it in a safe place for keeping, so that we may always have something to use in case of necessity.

At the close of our report on December 10, 1892, as will be seen on page 140 of the report for 1892, we had on hand of our savings \$302.31.

The Society has earned and received in cash from World's

Fair in settlement June, 1894.....	\$ 165.80
From St. Louis Exposition in November, 1894.....	150.70

From St. Louis Exposition in November, 1895.....	236.81
From Omaha Exposition.....	323.70
Total .....	<u>\$1,179.32</u>

This money was made for the Society by the officers giving their time and energy for the upholding of the glory of our State in its fruit displays, and should be kept for some special purpose for the work and honor of the Society. Of this \$1,179.32, by a vote of the Executive Committee, I have deposited with the Mississippi Valley Trust Co., of St. Louis, Mo., \$1,000 drawing four per cent interest for one year, and hold their certificate for the above amount.

Receipts.

June 30, 1900, balance on hand.....	\$ 329.78
July, cash from State Auditor.....	1,166.05
October, cash from State Auditor.....	490.69
From Omaha Exposition.....	323.70
Dec. 7, Membership 40, A. Nelson .....	40.00
Membership 17, L. A. Goodman ....	17.00
Total .....	<u>\$2,367.22</u>

Disbursements

Deposited with Mississippi Valley Trust Co.....	\$1,000.00
July 24, 1900, express, .50, .45, .50, .30, \$3.05, .35, .70, \$1.90, \$1.25, .75.....	\$ 10.05
500 P. O. cards, printed.....	6.50
P. O. bill .....	15.00
Salary of secretary for July.....	66.66
Salary of typewriter for July.....	20.00
Warrant No. 460 .....	<u>\$ 118.21</u>
Aug. 25, express .40, .60, \$1.25.....	\$ 2.25
P. O. bill, \$3.22; Scotford S. & S. Co., printing crop report, \$5.00.....	8.22
K. C. Paper House, paper and twine..	7.23
Salary of secretary for August.....	66.66
Salary of Typewriter for August.....	20.00
Warrant No. 461 .....	<u>\$ 104.36</u>

Sept. 29, express, \$1.70, .76.....	\$ 2.46	
Scotford S. & S. Co.....	3.25	
P. O. bill .....	2.68	
Salary for secretary for August.....	66.66	
Salary of typewriter for September....	20.00	
	<hr/>	
Warrant No. 462 .....	\$	95.05
Oct. 22, 10 bbls apples for Buffalo.....	\$ 20.00	
Freight, \$1.84, \$3.00, .60, .50.....	5.94	
Scotford S. & S. Co., printing.....	15.50	
K. C. Paper House, paper and wrappers	21.25	
P. O. bill .....	23.72	
Salary of secretary for October.....	66.66	
Salary of typewriter for October.....	20.00	
	<hr/>	
Warrant No. 463 .....	\$	173.07
Oct. 31 Whitehead & Hoag, 1,000 badges.....	\$ 48.00	
	<hr/>	
Warrant No. 464 .....	\$	48.00
Nov. 21, P. O. bill.....	\$ 10.00	
Express, .40, .45, .35, .35, .25, \$1.69...	3.49	
Scotford, 2,000 programs .....	12.50	
Scotford, scales, paper, bands, etc.....	6.40	
Salary of secretary for November.....	66.66	
Salary of typewriter for November....	20.00	
	<hr/>	
Warrant No. 465 .....	\$	119.05
Dec. 27, P. O. Bill .....	\$ 20.00	
Express, .75, .35, .83, \$1.21, .50, .31....	3.95	
Four barrels Apples Buffalo Exposition..	8.00	
Trip to Marshall and return, \$4.80 hotel,		
\$2.40 .....	7.20	
Salary of Secretary, December, \$66.66,		
Typewriter, \$20.00.....	86.66	
	<hr/>	
Warrant No. 466 .....	\$	125.81
Dec. 28, Premiums at Winter Meeting, Farming-		
ton .....	\$	101.00

Expenses of officers, delegates and stenographer .....	121.40	
Hotel bill for same.....	21.75	
Warrant No. 467 .....		\$ 244.15
Dec. 28, Stationery, \$3.15, gas for lanterns, \$3.....	\$ 6.15	
Freight, \$2.10, .90, .10, \$2.90, \$1.10....	8.30	
Express, \$2, \$1.90, \$1.70, \$2.30, \$8.55,		
\$1.05, \$3.80, \$1 .....	22.30	
A. Nelson, expense account .....	8.08	
Warrant No. 468 .....		\$ 44.83
Dec. 28, Expenses W. G. Gano to Iowa State Meeting .....	\$ 28.15	
Expenses M. Butterfield to Illinois State Meeting .....	22.00	
E. W. Stephens, binding 1M State Reports .....	150.00	
Warrant No. 469 ....		\$ 200.15
Total receipts .....	\$2,367.22	
Total disbursements .....	2,272.68	
Balance in hands of Treasurer .....		\$ 94.54

Farmington, Mo., Dec. 6, 1900.

Mr. President:

We your committee beg leave to report that we have carefully examined the accounts of Treasurer Nelson finding due credit for all moneys received and vouchers for all moneys paid and the same to be correct as reported.

Geo. T. Tippin,  
J. C. Evans,  
T. R. Peyton,  
Committee.

## PLACE OF NEXT MEETING.

Mr. Atwood named Springfield for the next winter meeting.

Mr. Irvine gave an invitation from St. Joseph.

Warrenton also asked for the winter meeting.

Mr. Dix nominated Jefferson City for the next summer meeting.

The place was referred to the executive committee.

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Warrenton, Mo., Nov. 4, 1900.

To the State Horticultural Society of Missouri, now in session at  
Farmington, Mo.:

Gentlemen:—

With great pleasure we extend to you the invitation to hold your next winter meeting at Warrenton, Mo., 60 miles west of St. Louis on the Wabash railroad. Courthouse and college buildings will be placed at your disposal; also hotel accommodations at a very low rate.

Very sincerely yours,

Polster Brothers,  
Fruit Growers and Nurserymen,  
Warrenton, Warren County, Missouri.

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Warrenton, Mo., November 29, 1900.

To the State Horticultural Society of Missouri, now in Session at  
Farmington, Mo.:

Gentlemen:—

I take pleasure in extending to your Honorable Body, in behalf of Central Wesleyan College, a hearty invitation to hold your next Winter Meeting at Warrenton, Mo., a beautiful college town on the Wabash R. R., situated 60 miles west of St. Louis.

Buildings for your exhibits and meetings will be placed at your disposal gratuitously and entertainment furnished at a low price.

Very sincerely yours,

Geo. B. Addicks,  
President Central Wesleyan College.

Warrenton, Mo., December 3, 1900.

To the State Horticultural Association of Missouri, Farmington, Mo.:  
Gentlemen:—

I extend to you the invitation of the people of Warrenton, Mo., to hold your next Winter Meeting with us. We have large, spacious rooms which will be put at your disposal. Hotel accommodations are first-class, and the hospitality of the people of Warrenton is second to none.

Hoping that you will see fit to meet with us and accept our "open door policy,"

I am, respectfully,  
F. J. Tainter, Mayor.

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### ELECTION OF OFFICERS.

The rules were suspended and the old officers re-elected one by one by ballot cast by some member of the society.

N. F. Murray, President.

D. A. Robnett, First Vice-President.

Sam'l Miller, Second Vice-President.

L. A. Goodman, Secretary.

A. Nelson, Treasurer.

Each of the officers thanked the society for the confidence reposed in them as shown by such unanimous re-election.

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### THE ORCHARD FROM THE STANDPOINT OF AN AMATEUR.

By C. H. Williams, of Quincy, Illinois.

I am proud to feel that for a time at least I may call myself a Missourian. There is honor in being a citizen of a State with so great

and many resources. I think orcharding will be carried here to an extent not found in any other land. I think you have the field before you. It is said that the aged never revise their judgments. So I was not at all surprised at the discussion of the whole-root or piece-root question. When I hear this I am reminded of the question "How many angels can stand on the head of a pin?" If we are to do great things in orcharding we must give up puerile ways. We must get rid of the idea that there is a panacea, any one thing that is a remedy for all things. We find that emphasis is placed upon one point for a time and then upon another and not always upon the same point. At one time emphasis is placed upon the spray-pump, at another it is cultivation or fertilization. Some place their whole faith upon one thing. The catholic orchardist, the all-round-man, will be the one who resists this impulse to emphasize one thing. There is a trinity of emphasis no one of which we can safely neglect. We can not reach salvation on one road. There is no royal road to success in orcharding. The orchardist must take a wide view and divide his energy according to the necessities of the case, he must not make the mistake of too great concentration. Some time ago I was in New York studying the apple situation. My serious business is buying and selling apples. I met an old farmer who attracted me, because of his love for horticulture. He said, "I am eighty, but I want to go to school to study botany. I have been studying fungi for five years and I intend to study till the Lord calls me away." I was glad to see him and hear him; to sit at the feet of the Master and learn of him. I think this society honors itself in listening to such men as Whitten, Stinson, Von Schrenk and Stedman, though they are young in years. We can leave the experiments to these men. I am happy to have such men to work for me.

Wishing to find some respectable way in which to waste my money I bought an old orchard. The trees were mostly Jonathan, thirty-two years old and fast failing. Most of them had very good tops on them, but nothing to hold them to the ground. The trunks were decayed and the limbs split, an old pruner said "If you can keep the tops alive nature will do the rest." I cut out the decayed wood, cemented the cavities solid, and painted the surface. I have not lost any since. I

wired the limbs together securing the strength of the whole tree for each limb, raised the limbs from the ground, and separated those that were crossing. I am encouraged to believe I have added ten years to the life of those old Jonathan trees. It has cost about seventy-five cents per tree, and I consider it worth ten dollars. We should not count expense only in the light of results it will bring. I knew of a man in New York who took an orchard as a gift from his father. It had not borne a profitable crop for years. By good care it has had eight good crops in ten years. Do not look at expense in a niggardly way. It is not fair to charge it all to the year in which it is spent. I believe we can never grow too much good fruit in this country for profit. I believe there will be an unlimited demand for fine apples. You can produce too much fruit that is not good in the orchards of large extent. Small orchards well cared for will be profitable. I believe it is the most certain of all sources of income. Be guided by the experience of the man at Leavenworth, Kansas, who "took in too much territory."

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## PEAR REPORT.

By Polster Bros., Wright City, Mo.

Ladies and Gentlemen;

A report of our experience with the pear was again asked for by our worthy secretary. Unfortunately we can not say much that is encouraging this time. Our experience recently has been that of so many others who tried to grow the pear for market. We seemed to be sailing in smooth water with about 1,500 pear trees, mostly Keiffer on board, when suddenly that foe blight struck us and blighted our hopes. In the past we had experimented with some fourteen varieties of pears, but found them all very much subject to blight, except Keiffer and



Garber. Leconte began to blight at once after planting. Lawson and Duchess appeared to be reasonably safe until they came into bearing and then rapidly blighted. Bartlett did pretty well until the second or third crop was gathered and then quickly followed the others to the pear sheol. Of course this was discouraging. Meanwhile the experience of others and our own with Keiffer and Garber was so good that as rapidly as those other varieties died we replaced them with Keiffer. Their soundness and vigor were a constant delight so that we concluded to cut out all others and grow only Keiffer and Garber. In the first place we were lucky to start out with about eighty per cent of Keiffer on board.

Had we never planted any other we should now be much better off. Our success was uniformly good and most encouraging until this summer when fate seemed to take delight in showing us what was possible. A pear orchard thirteen years old that formerly could hardly have been surpassed anywhere looked as though a fire had passed through it. Scarcely a tree escaped and the crop was a complete failure. It took all the wind out of our sails and for a time we felt that we had planted our last pear tree. Now, however, a careful examination shows that very few of the trees are actually dead and we hope to save most of them. We mean severely to cut back and take out all blight, burning all clippings. Then we shall cultivate and sow to cow peas. There is at present a fine showing of fruit buds so that the prospect is good for a large crop next season if we stop the further ravages of the blight. We attribute the large showing of blight the past summer to the injury done by the frost two years ago, during that phenomenally cold winter. The summer following, our trees did not seem thrifty. They did not leaf out well, and made little or no growth. The trees looked sick and the leaves lacked the strong characteristic green color of the Keiffer. When this summer came the trees appeared to lack vigor again. A peculiarity it seems to us, was that the blight appeared not as is so frequently the case among very thrifty trees but rather where there was a lack of vitality. An examination of the roots also showed a bad state of health many were even dead. We also noticed that trees on prairie soil or on land not well drained suffered more than those on timber

land or where the drainage was good. The blight this season appeared right at the time when the trees were in full bloom and it seemed as if the fruit spurs were effected first. A friend of ours has been experimenting with washing his trees when blight appeared on the trunk with strong salt brine and claims that in every case he has succeeded in checking the disease. If any of your members have had any experience in that line would be glad to hear.

### Discussion.

J. C. Whitten.—The question of what varieties are capable of setting fruits without cross pollination has been studied for several years. From what little we have done I may say that certain varieties of fruit are not capable of self-fertilization, just what varieties they are I am not prepared to report. The lists for other states may not be right for this state. This is true of grapes also. It is a good plan to plant different varieties together. In New York a majority of apples are impotent. In this State a large majority will set fruit in a sack; but it is safe as a general policy to plant blocks of different kinds near each other. Will the pollen affect the fruit of the present crop? In general the pollen has no perceptible effect upon the fruit, except in the case of corn. So it does not matter what variety furnishes the pollen. Ben Davis will be Ben Davis whatever kind may have furnished the pollen.

C. C. Bell.—I am glad the Professor has brought out this point. From what I have seen in gathering apples I am fully satisfied we must mix varieties for successful fruiting. I am very much in doubt whether pollen from a small variety would diminish the size of the Ben Davis or Gano.

Mr. Baxter.—It will be well to keep bees to carry the pollen just where you want it. I know of a strawberry patch in which all the plants were pistillate yet it had a good crop of berries. The bees carried

the pollen a long distance.

Prof. Stinson.—In our experience in crossing fruits we have found that the pollen used does not affect the fruit. Whatever pollen we used it made no difference in the size or color of the fruit.

Prof. Irish.—In crossing pears we could not see that the pollen used had any effect on the fruit.

Prof. Whitten.—Our crossed varieties at the station were all typical specimens of the several kinds the pollen made no difference in the fruit.

Mr. Shank, Illinois.—The fruit is only the covering or clothing; the seed receives the pollen germ.

What varieties would you plant?

C. H. Williams.—The Jonathan is the best you can grow. It is double the value of any other you can grow. I would use Ben Davis as a filler, to be removed when the Jonathan needed more room. Some day the buyer will discriminate on the point of flavor. He is getting very rapidly educated. You may flatter his eye with the Ben Davis but his palate will demand better quality.

K. B. Wilkerson.—Some orchard planters leave the selection of varieties to me, and I want this society to express its preference so that I may have something to fall back on and not be personally responsible for the success of the kinds planted.

Mr. Williams.—Here in the Ozarks I would plant the Nixonite if it does well as the samples on the table seem to indicate. The Grimes is a splendid apple and sells well when introduced. Where you can grow York, it is highly valued. I think you can not raise Bellflower any more. I would not give the Ben Davis too much prominence; but no orchard is complete without it. It has thirty years of success behind it. A large part of the American people will always be guided by appearances; but there is a fast growing tendency to emphasize flavor instead of color. If you want to live with the future, you have got to make your large planting of something else than the Ben Davis.

Sec. Goodman.—Let us have your list of about five varieties you would plant in your own orchard. Mine is Ben Davis, Grimes, Jonathan, Gano and York.

Mr. Stanton, Illinois.—Jonathan, Grimes, Gano, Ben Davis, and Wealthy.

Mr. Perrine, Illinois.—Ben Davis, Jonathan, Gano, York, Winkler and Benoin.

W. T. Flournoy, Lawrence Co.—Ben Davis, Ingram, Gano, Jonathan, Maiden Blush and Ben Davis.

C. C. Bell, Cooper Co.—Ben Davis, Grimes, Gano, Clayton and Evans.

W. G. Gano, Platte Co.—Maiden Blush, Grimes, Jonathan, Ben Davis, Gano and Ingram.

Prof. Stinson.—Gano, Ben Davis, Grimes, Jonathan, Givens and Collins. The last two are new Arkansas apples of much promise.

G. T. Tippin, Greene Co.—Jonathan, Ben Davis, Ingram, York, Paynes Keeper and Grimes.

Mr. Chandler, Kansas.—Ben Davis, Grimes, Jonathan, Ingram, Gano and York.

Mr. Dix, Cole Co.—Ben Davis, York and Black Twig.

Mr. Collman, Iowa.—Duchess, Jonathan, Grimes, Ingram, Minkler and Ben Davis.

Mr. Polster.—Grimes, Ben Davis, Gano and Jonathan.

Mr. Irvine, St. Joseph.—Grimes, Ben Davis, Jonathan, Gano, Maiden Blush and Wealthy.

Mr. Peyton, Audrain Co.—Ben Davis, York, Grimes, Jonathan, Ingram and Benion.

D. S. Helvern, Arkansas.—Grimes, Jonathan, Ben Davis, Minkler and Black Twig.

Mr. Carlan.—Maiden Blush, Grimes, Ben Davis, Grimes and Ingram.

C. J. Zeitinger, Wayne Co.—Jonathan, York, Winesap, Minkler and Ben Davis.

A. Nelson, Laclede Co.—Ben Davis, Jonathan, Gano, and Ingram.

Sec. Goodman.—If I were planting 10,000 trees, I would plant 2,000 Jonathan, 1,000 Grimes, 2,000 Ingram, 1,000 York, 2,000 Ben Davis, 2,000 Gano.

Question. What varieties would you plant on bottom land?

Mr. Jones.—In Kansas on bottom land I would plant Ben Davis; not a Ben Davis on upland in Kansas.

Mr. Gano.—Maiden Blush, Jonathan and Winesap for bottom land.

Mr. Chandler, Kansas.—Winesap for bottom land.

Sec. Goodman.—Ingram, Winesap and Black Twig.

Mr. Baxter.—Wet bottom is good for orchards. Some of the best orchards in Illinois are on wet prairie soil.

Mr. Wilkerson.—Our best orchards are on prairie soil.

Mr. Jones.—In Southern Illinois, in the big orchard region, the best orchards are on prairie soil.

Mr. Reed.—In Indiana the Winesap is best in bottom land.

Mr. Simpson.—Five best. Ben Davis, Jonathan, York, Grimes, and Duchess.

Mr. Reed, Indiana.—Winesap, Grimes, Jonathan, Wealthy, and Maiden Blush.

Mr. Collman.—The best Jonathan in Iowa are on low bottom prairie soil.

Mr. Sylvester.—Winesap and Jonathan for bottom land, other places, Ben Davis, Gano, Grimes, Minkler and Ingram.

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Potosi, Mo., November 17, 1900.

Mr. Goodman:

Dear Sir:—

The Nixonite apple originated in the county about 1825, the parent apple was purchased at Herculaneum on the Mississippi river by lead haulers from this region and was distributed among the miners. A Mr. Davis found the tree seedlings in what is known as Sandhill diggings and transferred them to his farm near by. Mr. John Evans, Sr. (deceased), purchased the farm in 1852 and rented it to a Mr. Nixon, and in honor of his tenant named the apple Nixonite. Two of the original trees are still living.

Yours very truly,  
Hiram W. Cook.

## SIXTH SESSION.—December 6, 2 P. M.

## SPRAYING.

By J. T. Stinson, Mt. Grove.

I will give you some experience of this and former years in spraying and give the balance of the time to questions. It is an important subject this year on account of the bitter rot.

Apple scab and codling moth are now quite well understood. I do not think there is a fruit grower in the whole State of Missouri who will question that spraying for the apple scab does pay. Most of them will say that it is dollars and cents to spray thoroughly for apple scab. When it comes to bitter rot, it is a question in the minds of the growers as to whether Bordeaux mixture is a remedy or preventive of that trouble. We have carried on some experiments this year and I want to give you some of the results; and I want questions asked that I may give you all the facts I have been able to learn. All of us can give some experience of the bitter rot this year. It has prevailed in South Missouri, Illinois and Indiana. We all recognize the disease, but some describe something else as bitter rot. One way we may recognize it is by the rings shown on the rotten part of the apple and the postules. These distinguish it from ordinary rot. As to the time it did the greatest damage in South Missouri, most of the rot took place at about the time the apple began to ripen, different dates for different varieties and different dates for various localities. In some sections in our locality it was reported in July; some in August and some in September, right here in the Ozark country. But whatever time it may have appeared, I would not advise you to defer spraying till about the time you look for the rot. We found that all the plats sprayed thoroughly throughout the season showed less rot than those on which the spraying was begun later by about two weeks. Thorough spraying made the fruit some two weeks later in ripening by keeping the foliage healthy. This would pay for the early spraying. The spraying kept

the fruit growing and green longer, thus enabling it to reach over the rot period of greatest danger. Even if the Bordeaux mixture was of no value in killing the spores of rot its effects in keeping the fruit and foliage green and healthy would pay. In former seasons spraying thoroughly through the season made the fruit considerably later in maturing. In this southern country we know apples do not keep as well as in some other sections, and if we can keep them green for two weeks longer than usual it is a great part gained. It is possible we may have a great advantage so far as the value of our product is concerned when we put it on the market.

The weather conditions are important as the disease requires hot weather to spread. With a glass, spores may be seen on the apples and yet if the weather is cool they may not develop. Hence some assume that spores did not cause the disease. You can find apples with spores of bitter rot on them which have not developed because the weather turned cool in time to check them, so they have not increased. When conditions are suitable these apples will rot and produce spores to infect others. This may happen in the barrel, as Mr. Tippin told you yesterday. These apples were allowed to stand in the sun for one or two days. I believe this bitter rot is a blessing to the fruit growers of South Missouri. I know it is if it does as Mr. Evans says it did forty-two years ago. It has caused more damage than anything else; but it will cause our fruit growers to study the subject thoroughly and go to spraying in earnest; and while he is spraying for bitter rot he will keep down the scab, the codling moth, and many other pests and will have the best fruit he ever grew. If we should have no rot, scab, codling moth, or other trouble, for five years the production would be so great there would be no money in fruit growing at all. The whole question comes down to raising the best grade of fruit and I do not believe we can do it without spraying. Some men get paying crops without spraying; but as a rule the man who will make the money is the man who cultivates, fertilizes and sprays; and they are the men who are going to continue to do it, and they are the men who get results.

This year we tried some experiments in the orchard of Dr. J. N. Lane. He furnished the material and the labor. The work was done

under our direction. He wanted to know if there was anything in it. We took several plats in his orchard treating each in a different way. The first spraying was done before the leaves opened. Some plats were sprayed three times, and some four times. This does not seem like very many applications. I believe Mr. Tippin will tell you it was done thoroughly. One thorough spraying is better than two or three half done, or four or any number. The plats in his orchard were selected in reference to the section where he had had trouble with the bitter rot. It first broke out this year in the place where it had done most damage before, about July 15, and in the last few days of July it spread to the Ben Davis on old trees

On the unsprayed plat we picked two bushels of good apples and 148 bushels bad. On the sprayed plat of the same size along side the unsprayed we picked ninety-nine bushels good apples and sixty-seven bad. Some of the sixty-seven bushels were small and not rotten. The culls were valuable enough to pay for the work.

The next plat, further away from the center of infection, was sprayed four times. It produced 96 bushels good fruit, 110 bad.

The check plat by the side of the one last mentioned, and still farther away from the center of infection, unsprayed yielded eighteen bushels good apples 104 bushels culls.

It seems there can be no question of the value of the Bordeaux mixture in checking the bitter rot. The plats mentioned above were Ben Davis.

A sprayed plat of Huntsman gave 80 bushels good and 20 bushels bad. Huntsman not sprayed gave twenty bushels good, twenty bushels scabby and sixty bushels culls.

The Willow Twig is the worst to start the disease in the orchard. I believe that is the universal expression in reply to circulars sent out from the station at Mountain Grove. In this orchard we had one tree of Willow Twig from which Dr. Lane had never been able to get anything. It was sprayed six times and gave two barrels of nice apples.

I don't want to bore this audience, but I will say that I believe spraying is one of the things that is necessary for us fruit growers to do. I believe we will have to do it. I don't believe we can afford to wait



to see if the bitter rot will continue or disappear if left to itself. We must spray as a preventive measure. It was suggested that thinning the fruit would help prevent the rot. I believe it is a good point. It is necessary to keep the orchard clean of the mummied apples on or under the trees. The spores live on the apples and the next spring are scattered. Another point is cultivating and feeding. I question whether a man can grow fruit and leave out cultivation and fertilizing. If the vitality of the tree is strong we can overcome the rot and other diseases and insects. It was my observation for five or six years in Northwest Arkansas that the man who cultivates well and keeps the moisture in the ground in the dry hot period of July and August is the most successful.

The results of the season's work convince me that bitter rot can be controlled; but I do not consider spraying a panacea for the bitter rot, but I do believe that with the other two things, cultivation and fertilization we can control it entirely.

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### SOME REMARKS ON SPRAYING.

By E. J. Baxter, Nauvoo, Ill.

Fungus diseases and insect pests have become so numerous and so destructive to fruits in general that it is now almost impossible to grow a fair average crop of good fruit without spraying. Spraying to be successful must be understood and properly carried out. When we began to spray eleven years ago, we had little to guide us besides our own experiments. As a result we met with many disappointments and vexatious trials, and yet, we believe that on the whole, we have made a success of spraying, for we have succeeded in saving our crops when our neighbors who did not spray and even some of those who did spray lost their's time and again. What better evidence of success can be desired.

There are three essential points to be observed in successful spraying.

1st. To make the mixture properly, for if it is not made as it should be you might as well pour it out on the ground for all the good that will result from using it.

2d. To apply it at the right time. This is very important for there is a time if you delay beyond which all other sprayings can not recoup the damage done.

3d. To apply it properly. If these three points are rigidly followed you will find that spraying is a success.

#### HOW TO MAKE THE MIXTURE.

Procure the purest sulphate of copper that there is to be found in the market. By pure sulphate of copper I mean the pure blue stone free from sulphate of iron and sulphate of zinc. The purest we have been able to find is made by the Nichols Chemical Company of New York City. They guarantee their product ninety-eight per cent pure. For every fifty gallons of mixture you want to make take six pounds of blue stone, put it in a common flour sack and suspend it in a wooden vessel containing more or less of clean water, according to the quantity of blue stone you want to dissolve, and the quantity of mixture you want to make. The temperature of the water makes but little difference. We have dissolved forty pounds of blue stone in forty gallons of cold water within five hours. Next procure some good quick lime and slack it properly—be very careful that it does not burn in slacking, for if it does, it is useless for your purpose—it will not blend with the vitriol and it will not make a perfect mixture. We prefer in the early spring to slack all the lime we need for that season. We keep this slacked lime in a pit or in barrels sunk in the earth covering the lime with a little water to keep from drying. These ingredients—vitriol water, and putty lime as we call it, you can prepare as suits your convenience, but they should never be mixed—that is the Bordeaux mixture should never be made until you are ready to use it, and then use it the same day as made.

When ready to make your mixture, ascertain the capacity in gallons of the vat, barrel or vessel in which you are to make your mixture, and for every fifty gallons of capacity take ten pounds of this slacked or putty lime and put it in your mixing vat or barrel. Then add a little water and work thoroughly with a hoe to dissolve the lime and as it dissolves keep adding water until your vat or barrel contains nearly one-half the quantity of mixture you want to make. If your lime is gritty and there is much deposit after dissolving, this lime water should be strained through a fine sieve before adding the vitriol water. With the lime we use, we very seldom find it necessary to strain the lime water.

Have in another vat or barrel standing along side of your mixing vat, the proper amount of blue vitriol dissolved and diluted to nearly half of the amount of mixture you want to make, and when your lime water is all ready pour this vitriol water into your mixing vat containing the lime water, as quickly as possible stirring the mixture thoroughly the while with a hoe. Made in this way your mixture will be perfect, and you can apply it without any doubt of success if applied at the right time and in the proper way.

#### WHEN TO SPRAY.

The proper time to spray depends very much on the kind of fruit and the thing to be combatted. We make no mistake however, when we advise you *never* to spray your vines and trees when in bloom. It is worse than material lost. We have tried it and we speak from experience. As a general rule you can make no mistake in spraying your vines and trees just before blossoming, and at this spraying it is not necessary to use insecticides in solution with the Bordeaux mixture. Another very important period when spraying should be done, as a general rule, is immediately after the fruit has well set in grapes, apples, pears and quinces. At this spraying of the apple, pear and quince and each subsequent spraying add three ounces of Paris green, or its equivalent of some other insecticide to each fifty gallons of the Bordeaux mixture. To add the Paris green so it will blend as perfectly as pos-

sible with the Bordeaux mixture, first add just enough of the Bordeaux mixture to the Paris green to make a paste, work thoroughly with a paddle, gradually dilute with more of the Bordeaux mixture, then pour into the mixing vat and stir thoroughly. It is useless to use an insecticide with the Bordeaux mixture in spraying grapes. In stone fruit such as cherry, apricot, peach and nectarine, the spraying with Bordeaux mixture can be delayed until after the cap that envelops the fruit bursts and begins to drop off. At this time the curculio begins her work of puncturing the fruit and depositing her eggs when spraying should be immediately begun with the same mixture as recommended for apples, pears, etc., and should be followed up several times during the season as the state of the weather may require. The oftener it rains the more sprayings are needed. In spraying the peach and the nectarine and even the Japan plums much care must be taken not to scorch or burn the foliage. In spraying these trees we would recommend using not more than four pounds of blue stone, ten pounds of putty lime and two and one-half ounces of Paris green or its equivalent of some other insecticide, to each fifty gallons of water. This formula has given us very good results.

#### HOW TO SPRAY.

Procure a good pump with plenty of force, and the best nozzles that are to be found in the market. A good nozzle that will throw out plenty of fine mist—the finer the better—is of prime importance. The best nozzle that we have found thus far is the “Dewey.” The Vermorell is very good. In knapsack sprayers the best that we have yet found is “l’clair” made in France by the Vermorell Co. It is about as perfect as we can expect, and used carefully, it will last a life-time. In applying the Bordeaux mixture use plenty of force, and be sure to cover every part of the tree and vine, fruit and wood as well as foliage.

#### HOW TO SAVE A CROP OF GRAPES FROM MILDEW AND ROT.

If the vineyard has never been sprayed before, and the grapes in previous years have rotted badly, prune your vines early in the spring—

if they were not pruned in the fall—clean out all the brush and leaves and burn, then tie up the canes. As soon as tied and before the buds begin to swell, dissolve six pounds of blue stone in fifty gallons of water—add no lime to this, and spray your vines thoroughly with this vitriol water being careful to cover thoroughly not only the canes of the vines, but the trunk also, and the trellis and even the ground especially if there are any leaves or rotted fruit remaining there. The second and third spraying should be made with the Bordeaux mixture as specified in the foregoing, just before blooming and right after the fruit has set. A fourth spraying should be made from the middle to the latter part of June according to the condition of the weather. The oftener it rains the oftener one should spray. After from one to three years of this treatment, two sprayings in one season will be enough to save your crop in ordinary years. We now save our crop with two sprayings.

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### DUST SPRAY.

By J. J. Kiser, Stanberry.

This is the topic that has been assigned me by our worthy secretary. The dust spray, I believe is on the threshold of universal adoption. The close and careful investigator finds no new fangled ideas about the dust spray; on the contrary, he finds precisely the same formula that are used in the liquid sprays, lime being used as a conveyer instead of water. The essential elements of every tested formula are in the powdered form, except perhaps kerosene emulsion, and there is no more reason in advocating that our fungicides and insecticides are more effective when applied through water as a conveying medium as against lime dust for the same purpose than there would be to argue that a dose of quinine would be more effective taken in water than in its powdered form.

So in considering this subject from a practical standpoint we must not fall into the too common error of combatting it as something new that must be tested before we can decide. If I use the standard dry Bordeaux mixture and use powdered lime to convey it to my trees, and my neighbor uses water for the same purpose, there can be no room for argument as to the effect of the Bordeaux mixture when applied either way. We can and ought to intelligently discuss the relative value of water and lime as a conveyer for the mixture. Under this head would properly be classed the following questions:

- 1st. What effect, if any, does the conveyer have on the formula?
- 2d. What is the relative amount of time and labor required to prepare and apply them?
- 3d. Is the spray more perfectly applied and distributed by the one process than the other?
- 4th. Do its effects last as long or longer by one process than the other?

These are pointed, practical questions whose proper and practical solution will save the horticulturist much time, labor, vexation and money. When we analyze and construct correct premises to reason from, our conclusions will be apt to be correct, and it prevents us from making straw men and demolishing them.

“We should seek truth wherever found,  
Whether on Christian or on heathen ground.”

An ounce of practice is worth a ton of theory, a good practical idea should be appreciated and cherished, no matter how humble the source.

To proceed then with our first question. What effect, if any, does the conveyer have on the formula? If the premise we have established is logical and correct, the only ground for difference of opinion as to the relative merits of the two methods of spraying is a comparison of ways and means of application. No one can or does claim any virtue for the water used simply to dilute our formula should we deluge our trees with water alone we could not expect any benefit, while lime, even by itself is a good fertilizer, insecticide and fungicide, admittedly bene-

ficial to plant life. If it diminishes the effect of the standard spray application the proof rests on the other side and we proceed to

Question 2. What is the relative amount of time and labor required to prepare and apply them?

I believe I can dispose of a large proportion of this part of the discussion by the single remark, that we all dread water hauling time. I will not ruffle your feelings by recounting the vexations and difficulties we meet on every hand, and he is a brave and determined soul who performs his whole duty when spraying time comes; in fact the labor, inconveniences and vexations mishaps, inseparably connected with the liquid process has done more than anything else to cause men to investigate and seek for better methods. Incidentally this has given a surprising impetus to the dust process, which is easily prepared, rapidly applied saving both time and labor. But to be more specific: Take an orchard of twelve year set trees (about an average size) and it will take at least — gallons of water to spray each tree properly. To convey one pound sulphuric copper as Bordeaux mixture by the liquid process requires ten gallons of water; with the dry lime process it requires ten pounds lime dust to one pound sulphate; now the problem is: With our present facilities for applying either of these which is the most practical? With the one we have a slow and laborous task to partially get over a very few trees, with the other a rapid easy and much more effective process, with the same amount of labor and spraying material reaching vastly greater results. Last May I sprayed within three hours 1,040 eight-year set apple trees with the assistance of one man. Ten pounds of dust will amply spray from 60 to 75 of the largest apple trees.

Under the head of practicability must also be taken into consideration the labor of preparing the two processes. Carefully read the very particular directions how to prepare Bordeaux mixture; note the care recommended how to dissolve the sulphate in wooden or earthen vessels, how to strain and how to treat the lime. Now pay particular attention whether you are to pour the solution of copper into the lime or *vice versa*, very carefully weigh the arsenites and see that you do not get too much or too little; after all that a certain chemical test is recommended to

ascertain if your mixture does not require more lime, etc.; after all this, be careful—very careful to keep properly agitated—don't forget!!

The common every-day man is not capable of doing this work properly, to say nothing of the ordinary hired help. When we come to mixing the arsenites with Bordeaux, some of them will not dissolve in or assimilate with it and will settle to the bottom as so much fine sand and the result will be, unless constantly and thoroughly stirred, partly the application of a mixture too weak for an effective insecticide and partly the application of liquid fire. While the dust spray can be easily and properly mixed by any one having ordinary intelligence, and once mixed is always mixed and ready for use, with no danger from unscientific manipulation.

Another weighty consideration: Much spraying must needs be done by men who farm and whose teams are needed in the cultivation of their crops. Liquid spray and the necessary heavy weight of pumps and liquids require good teams, illy to be spared from the necessary farm work. The Dust Spraying Machine requires the use of only one horse or it can be mounted on a hand-cart and easily conveyed through the orchard, and mounted in the latter form it is well adapted for, not only the orchard but to situations where a knapsack or hand-sprayer only could be used in the liquid process, thus saving the expense of an extra spraying outfit. When the work is done it can be put away without the extra work of cleaning and oiling nozzles and pumps and be always ready for instant use.

We proceed to the investigation of the third question: Is the spray more perfectly distributed or applied by one process than the other?

I am always more than pleased to be able to quote scientific authority on subjects under discussion.

On page 4, November issue of *The Western Fruit Grower*. Prof. Whitten has this to say:

"In one large orchard in central Missouri the influence of spraying with Bordeaux mixture for apple scab was very apparent. Trees in the corners of the orchard, along a ditch and other places which could not be reached with the spray tank were badly attacked by scab. The fruit



was badly spotted and misshapen and the leaves were also badly affected. The main part of the orchard which was reached by the spray was almost entirely free from scab. Not only was there a great difference in the amount of scab on sprayed and unsprayed trees, but the same difference was noticed between the individual branches of the same tree where some of the twigs were not reached by the Bordeaux mixture. One of the most important sprayings was that which was done just after the blossoms fell. The wind was blowing from the southwest so the spray had to be applied from that direction. This prevented the spray from reaching the northeast section of the trees and here considerable scab developed on fruit and leaves.

Not only was the fruit injured by scab where the spray was not applied, but the leaves were so badly affected as to turn brown in spots and begin to drop from the trees prematurely, leaving the twigs and buds poorly developed for next year. There was a marked contrast between the appearance of the scabby leaves and the rich, dark green of the sprayed ones at the time of the gathering of the fruit."

Note here the fact stated—not to speak of the several places inaccessible to spray tank, that with the advantage of the wind blowing the spray, it did not reach the opposite side of the trees. While the dust spray envelopes the tree in a cloud of dust, reaches not only all sides of the tree but every limb, twig, leaf and fruit, top, sides and undersides, and not only on the tree next to the operator, but if the motion of the atmosphere is favorable and properly taken advantage of several rows of trees at the same time; also distributing the spray all over the ground under and between the trees, finding the hiding places of many of our enemies.

4th. Do its effects last as long by one process as the other?

In answer to this question I can state my experience with the fall canker worm. For years they have more or less damaged many of my trees. In the latter part of May last I applied dust spray in my orchard, several formula but all containing arsenites. In the first week in June we had heavy rains, the guage record showing over five inches. I followed Prof. Stedman's advice given at Princeton last winter that if there were no diseases in an orchard he would not spray, but the last

summer has developed them and I will have to spray in the future. About the first of August, more than two months after the application of the spray, the fall canker worm attacked my trees in force, hundreds of trees showed their work, but on no tree did they get over more than one limb, and I found no limb defoliated as large as my finger except on one tree that I did not spray at all which they stripped in short time.

So far we have found that the advantages of the two methods are practically on the side of the dust spray. Decidedly good results have followed the application of home made mixtures. It may be said, and is said, by manufacturers of the prepared compounds that a mixture of dry crystals of sulphate of copper and lime dust is not Bordeaux mixture. Your humble servant is not a professional chemist, but if the results of its application are as good and effective, will not a rose by any other name smell just as sweet? But if we must have the exact formula it is readily obtainable. It may be that the uncertainty of obtaining a chemically correct liquid homemade Bordeaux mixture through ignorance and other causes may partially account for many of the failures reported. Certain it is that the difficulties of its compounding and application have deterred thousands from using it. With the easy and simple way of mixing, dry spraying should and will become universal. Wherever and whenever tried it has more than held its own with a greater percentage of success to its credit than the liquid spray; this may be largely due to its easy application. The only drawback has been the lack of a thoroughly practical machine for its application. Many years ago I used a perforated bottom baking powder can, since that I have used various improved methods, and when practical means of application become available the practice will expand.

Considering the importance of this subject, you will kindly and patiently allow me a little more time to refer to the well authenticated experience of others. It may be that the experience of the man in France who a few years ago sprinkled lime and vitriol on his grapes to deter thieves from stealing them and accidentally stumbled on to the greatest discovery of the age from a horticultural standpoint, and the experience of the eastern farmer who saved his wheat crop from destruction by Hessian flies by scattering quick lime on his field as the wheat

was coming up, are too far fetched, but the experience of such men as Mr. G. C. Johnson of Argentine, Kansas, and of Mr. W. D. Maxwell of St. Joseph, Mo. will be worth our time to investigate. Three years ago, Mr. Johnson on my advice bought a dust sprayer and sprayed his orchard with a dry mixture of London purple, finely powdered sulphur copper and lime dust and although the orchard was considered about exhausted, the resulting crop was so fine that 85 per cent was graded "choice" by a Kansas City commission house. The next year Mr. Johnson sprayed with a specially prepared liquid spray, result: fruit not nearly so good as the previous year and badly fallen off, while the year he used the dust spray and saved his crop, his nearest neighbor practically lost his whole crop by worms and falling off.

Mr. Maxwell's statements may be found in the October issue of *The Western Fruit Grower*. On page 3 is a statement of the condition of four orchards, one of which had been sprayed four times during the summer with dust spray, the others were not sprayed. The orchards are located a short distance Northwest of St. Joseph, Mo. The statements in part are:

1st. "The trees are in a healthier condition than are many of my neighbors."

2d. "The leaves are free of scab."

3d. "About all the fruit my trees set is on the trees now" (after the storm).

4th. "The scab did not affect the stem of the apples as it often does and the fruit did not blow off."

5th. "There is less fruit under a dozen of my trees than there is under one tree of some orchards in this county, and I believe this is due to the healthy condition of the trees, and I also believe this condition was largely brought about by the insecticides and fungicides that I applied."

The above are the words of Mr. W. D. Maxwell, the owner of the orchard. In reply to the question of the effectiveness of dry spray he said:

"I believe it is a good thing, it seems to be just as effective as the liquid spray and it has the advantage of being more convenient. \* \* \*

The best results I believe are secured by spraying early in the morning or late in the evening when the trees are damp; then the dust settles on the moist leaves and seems to stick tighter. However I have sprayed all day long when once I got started. Sometimes when the wind was not strong but still there was considerable air moving, I have noticed that the dust seemed suspended in the air for a distance of six rows ahead of where I was at work. It settled on every leaf seemingly and I believe it did a great deal of good. \* \* \* I will spray once at least later than I did this year, for I believe there was a brood of codling moth that I missed."

The editor in commenting on above statements, says:

"The fact remains that in the same locality, on the same soil, on trees of same age, he has about as many apples as the rest of the township combined. If spraying did not bring about this result, what did?"

In speaking of the quality of the fruit, he says:

"Mr. Maxwell's number twos were better—much better, than the best of the stock that was unloaded in the market from other orchards."

The editor gathered some leaves from the other orchards that were badly affected by scab, and Prof. Whitten of the Agricultural College predicts in the same issue of above named paper, that the disease will affect the vitality of the fruit bud.

*Verily, it is time to spray.*

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Golden City, Mo., July 29, 1900.

Mr. L. A. Goodman, Secretary State Horticultural Society:

Dear Sir:—

I write you to get any information you are able to give about the destruction of insects that injure the apple. I bought a farm here in Dade county, Missouri, last spring that has forty acres of apple orchard, bearing age. I have had no experience in apple growing. I have a sprayer mounted, operated by sprocket wheel and chain. I sprayed three times, commencing when the bloom dropped, using blue vitriol and lime the first spraying; added Paris green at the rate of one pound to one hundred gallons of water the second and third times, eight days be-

tween sprayings. My apples are more or less stung by something, I suppose the apple curculio. If you could give me any light or tell me where I can get the information wanted, it will be greatly appreciated. Hoping to hear from you, I remain,

Yours truly,  
A. R. Downing.

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Cameron, Mo., November 19, 1900.

Mr. L. A. Goodman, Kansas City, Mo.:

Dear Sir:—

Your notice of time and place of meeting of Missouri Horticultural Society thankfully received.

I have a few questions that have been frequently asked by my neighbors, that I can not answer satisfactory. Our apple orchards and fruit were attacked with scab this season and nine-tenths of the fruit was ruined, and old trees either killed or partly so. I have been spraying for ten years, but not for scab, which is the most serious pest at this time. Canker worm greatly injured our pears. The codling moth finished what few apples the scab left.

I would like to know the best time and formula to spray for the scab, codling moth, canker worm and curculio, also if there is any remedy by spraying or otherwise, for the anthracnose on the raspberry canes.

The last season was the most serious we ever experienced and the indications are that we must spray often and intelligently or quit trying to raise fruit.

The "much abused" Ben Davis come out ahead in size and soundness. The Jonathan and Willow Twig were badly affected with bitter rot. Minkler and Grimes Golden withstood the attack of scab.

Hoping that I have not transgressed on your time, I am,

Respectfully,  
W. W. Knoop.

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Baring Mo., December 1, 1900.

Mr. L. A. Goodman.

Dear Sir:—

I have received your program for the winter meeting of our State Horticultural society, and see therein many excellent papers and sub-

jects of great interest to be treated on and for debate during the meeting. Farmington is too far away from my home, to hope to be present at your meeting. I wish you and all who can attend, a good, happy and enjoyable time, which no doubt you will have as usual. I am glad to see the names of most of our horticultural friends, and veterans booked to be there, who as usual will give new vigor and confidence in horticulture, who give us their valuable experience of their success, and also their failures, as a guide for new beginners to profit by. In regard to our fruit trees they are going into winter quarters in fair condition. This has been a trying season on trees. In the first place the canker worms did much damage to the apple trees. Then we had a wet spell from the middle of May to the latter part of June, which developed scab to a very injurious extent, and lastly, a drought of nearly three months duration followed, combined with two months of extremely hot weather, all of which was not an ideal season for tree growth, but as our apple trees had a very light crop, and since in late September we had plenty of rain, the trees look promising for a crop next year. We had fairly plenty of early apples, in particular, Duchess and Red Astrachan. But from 120 Ben Davis trees we had about fifteen bushels of poor scabby, knotty things, hardly worth gathering. Now and then a local orchard had a better show than mine. We had a fine crop of Kieffer and Duchess pears. We had a fair crop of cherries also the same of plums. I have Wild Goose, Marianna, Damson, Golden beauty, Burbank, Wickson, etc. Burbank bore some fine large specimens to perfection. My Wickson, only one year from graft, bloomed, which proves them early bearers. My strawberries were excellent, both in quantity and also in quality. My best strawberry, every way, is the Clyde. It comes the nearest of being the berry I have been looking for in the last twenty-two years of my strawberry experience, it combines earliness, good size, productiveness, holding out good size to the last, good strong plant, making plenty of strong runners. It is good for home use and nearby markets, perhaps too soft for distant markets. It is away ahead of all the following sorts on my place: Crescent, Bubach No. 5, Wilson, Jersey Queen, Mt. Vernon, Bismarck, Parker Earl, Ivanhoe, Margaret, Wm. Belt. This last one I have dug out, as it rusted so badly that I never got a perfect berry from it, although M. Crawford considers it very valuable in Ohio. Now the Clyde might not do as well on different soil and treatment as it is doing for me, so every grower should have an experimental bed, and give different varieties at least two years' trial, and then make his main patch of a few of the best behaved sorts. It is not a good idea for a new beginner to invest in every high priced new novelty, nor patronize those slick tongued nursery tramps, who show unreasonable fruit plates and

bottle specimens, at extraordinary prices, but spend a half of a day or a day and visit some man of some experience of which a few may be found in any county. Such men are always ready to give a new beginner their advice and experience and thereby save him both money and time in experimenting, and perhaps be able to furnish him with suitable plants and trees suited to soil and location. I have many a time spent money for useless novelties, but once in awhile got hold of something valuable. But now there should be no excuse for wasting money on worthless novelties, for we can inquire of officers of our State Horticultural society, and also of our State Experiment Station, all of which will be pleased to give us good advice and instruction.

The people of Missouri, and in particular our young generation, should appreciate the great advantages which they enjoy to-day, which has been made possible for them by the untiring efforts of such grand men as Gov. Colman, Evans, Murray, Goodman, Judge S. Miller, A. Nelson, and a host of others, and I hope to see them all duly honored, while they are still living and working with untiring efforts for the benefit of their fellowmen and collaborators in the good cause. Their names will stand and be known hereafter as bright lights to untold generations, who will appreciate them and honor them. When names of our millionaires will have sunk into oblivion.

Dear sir, as I am afraid this may go into the waste basket if I don't stop in time, I will close with best wishes for an enjoyable time at Farmington next month, and remain,

Yours fraternally,  
Peter Dailing.

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Olden, Mo., July 27, 1900.

Mr. L. A. Goodman, Kansas City, Mo.:

Dear Sir:—

Bitter Rot is developing rapidly, apple crop liable to be knocked out again this year. There is scarcely a tree in the old Ben Davis orchard on the Bates Place but that shows bitter rot. Have given it four thorough sprayings this year. I sprayed one block of it three times last year with carbonate of copper and ammonia and Paris green twice. We have had no hot day this summer and no time of ten days without copious rain.

Enough to discourage an Egyptian mummy.

Yours truly,  
H. E. Mosley.

Bolton, Mo. November 27, 1900.

L. A. Goodman:

By your request I send a little of my experience.

I have been using boiling water for twenty years to kill chinch bugs, potato bugs and all others that injured garden truck. A year ago last spring I took a small apple tree that was badly injured by the white root louse, the roots at the time being completely covered with the lice. I dipped the tree in boiling water three times using about two seconds at each dip. The tree made a fine growth this season. The aphid has not made its appearance on the roots. I think it would be well for those who are troubled with the aphid to give boiling water a fair trial. I have applied hot water to the limbs of plum trees with fruit on, as near boiling as I could get it to them, when the plums showed the first sign of rot which resulted in more perfect fruit than on the part of the tree not so treated.

In order that nursery stock may be entirely free from insects it should be dipped in boiling water before planting if there is reason to fear it is affected. It should be known just the number of seconds that each kind could remain in boiling water, and if this requires too much haste then we should know the degrees of heat that is required to relieve the tree or plant without injury to it. So that we could avoid the danger of shipping to our farms injurious insects.

Each season adds fresh evidence to the completeness of my system of ditching and draining to keep my garden well drained or irrigated as the season may require.

I. Neff.

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### MOTH CATCHER.

S. A. Haseltine, of Springfield, has made a "moth catcher" which consists of a torch and two pieces of tin put at right angles to each other with the torch in the center. It seems to be effective and is worthy of trial. The only question to settle is, if we do not catch as many friends as enemies.

### Discussion.

Mr. Perrine.—What was the strength of the Bordeaux used by Prof. Stinson?



Prof. Stinson.—I advise the use of five pounds or more of the copper sulphate to fifty gallons of water.

Mr. Perrine.—How late did he spray?

Prof. Stinson.—This year till the first of August. There was no objection raised to the apples on account of the mixture remaining on them.

Mr. Perrine.—Have you had any experience with a very weak mixture?

Prof. Stinson.—No, I have not.

A. Nelson.—The bitter rot appeared first upon a yellow apple, the Lowell, in July and then upon the Maiden Blush, about August 5. I have a question to ask. What shall we spray with this winter to keep it in check?

Prof. Stinson.—Do not spray till in the spring just before the buds open with the copper solution, one pound of the sulphate to twenty-five gallons of water. It seemed of great benefit, this early spraying.

Mr. Simpson.—What time would you spray for the bitter rot alone?

Prof. Stinson.—I would spray about the first of each of the months of May, June, July and August. In this way you can keep your trees in comparatively good condition in the hot weather. We have found that spraying gives us more bushels to the acre, enough to pay for the spraying. I would not say once a month, as an invariable rule. If the season is favorable you may run longer; if bad, even oftener. We use four pounds of stone lime to the fifty gallons of Bordeaux, leaving out the dregs.

Mr. Baxter.—We could not succeed with that quantity of lime. It does not save our crop. Those who have been using four pounds of lime to six of blue stone have not succeeded.

Prof. Stinson.—We have used four pounds of lime to six of blue stone for nine years. It is always effective.

Mr. Dougherty.—There is great difference in the strength of lime made at different places in this country.

Secretary Goodman.—I ask Prof. Stedman if lime alone is not of great value?

Prof. Stedman.—It answers very well for many insects, especially if the plants have dew upon them when it is applied. It is more effective when used dry than in water, but taken all in all I would not advise doing away with the spray pump and water as means of applying insecticides and fungicides. Use both dry and wet applications as may best meet the needs of the case in hand. Sometimes it is much easier and quicker to use the dust. It is very convenient in home gardens. In many large orchards it is necessary to use dust or nothing. Some ground is too rough to haul a heavy pump and barrel of water over. Some may be too soft when you need to spray. My impression is the dust machine will prove a distinct benefit in many cases. You must meet the conditions and use that which is best. We have a new insecticide, arsenate of soda which can not be applied with dust. I think it the best we have and so far I have found no way of using it dry. We can combine more things in liquid than in dust. Instead of spraying for one thing we can combine fungicides and insecticides for both biting and sucking insects and thus do the work all at once. The kerosene attachment to spray pumps enables us to use a mixture of kerosene and water, thus saving us the great trouble of making kerosene emulsion. The insects which the kerosene will not kill may be reached with the arsenate of soda. Arsenate of soda you will have to make yourself; you can not buy it. Buy two pounds of white arsenic and eight pounds of sal soda. Put these into an iron vessel and add water to make two gallons. Mark the two gallon point on the vessel. Boil fifteen minutes. If the chemicals are good the solution will be perfectly clear without sediment. Add enough water to replace that lost by evaporation, making two gallons. Put the mixture into a jug marked "Poison" and lock it up. Use two quarts of this mixture and eight pounds of fresh stone lime to one hundred gallons of water. It has this advantage over Paris green, London purple or anything you can buy. You know absolutely how much arsenic you are using. The arsenate stays stirred in the water, it don't settle. I want to mention another thing. Years ago we had no trouble with Paris green. It is now often adulterated. People often spray with it without any good results. Some states passed laws requiring Paris

green to show fifty per cent arsenic, as it should if pure. This law is evaded by adulterating the green and then adding enough white arsenic, which is much cheaper, to make the fifty per cent arsenic. The trouble with this adulterated mixture is that the white arsenic is soluble and burns your foliage. I advise you never to use London purple or Paris green for peach trees. Arsenate of soda will not burn the plant.

J. J. Kiser.—I am sorry the Professor has not succeeded in making the arsenate of soda available to use in dust form; but is it necessary? We slack our lime in a solution of concentrated lye which makes it effective against most insects. We make a saturated solution of sulphate of copper, put the lime in a basket and dip it in the water till it begins to drop to pieces. I don't care whether it is Bordeaux mixture or not, if it gives the results. I will tell you that sulphur is a good insecticide and fungicide. You can use it in a dust, but not in water. We have been using the dust sprayer for a long time with big results.

Mr. Chandler.—Would there not be danger of poisoning the man who sprayed with the dust spray?

Mr. Kiser.—Not so much as with the liquid spray.

Mr. Tippin.—I ask the chairman to give me an opportunity to make an explanation. What I said about planting apple trees in South Missouri seems to have made a wrong impression. I did not mean to say that I would not plant apple trees in South Missouri. We have thousands of acres of good apple land in South Missouri, and thousands of acres not good. On the same forty acres in this, or other, states and countries, may often be found land for good and long lived orchards and other parts not good at all.

Mrs. Hollis, near this place, has a pear tree, Kieffer, I think, which in former years bore good fruit, but the present crop, though fine looking, is so bitter, either raw or cooked, that it is not fit to eat. What is the matter with the tree or fruit? Even the chickens and pigs will not eat the pears.

Prof. Whitten.—I am sorry to say that I do not know. I think it is due to some disease which has attacked the tree. I would like to have some of the pears to make a chemical test of them. If you will send me some of the pears we will try to find what is the matter with them.

## GRAPES IN MISSOURI.

By Ralph Bush, Bushberg, Mo.

It seems to me very difficult to treat such an inexhaustible subject in a short essay, therefore kindly pardon me if I omit items that are essential to elucidate this matter. Who can tell us beneath what skies this most delicious fruit originated? The Bible tells us that after the great flood Noah planted a vine which according to legend was given him by the Almighty, we also learn that Bacchus brought the first vine into Greece from India, grape seeds were found in the Egyptian tombs more than three thousand years ago, during the Homeric and Hesiodic period wine was in use, and when Moses sent messengers to search the land of Canaan, two of these returned bearing a cluster of grapes on a staff. Thus it is evident that the grape vine has wound its tendrils and given its luscious fruit to mankind from time immemorial.

But in this our practical age we must examine more minutely into the requirements as to what is necessary to bring this industry to a pleasant and profitable issue.

I will have to omit the great influence of the mean and extreme temperatures, the amount of general rain falls, and of the influence of large lakes and rivers on the grape. Naturally the altitude, soil, and general location of a vineyard is of the very first importance. You can well understand that no locality is suited to all grapes, and that unless a variety has been tested, well tested, in your vicinity beware before you spend much money and your valuable time.

Among our correspondence we are often asked, "what variety shall we plant," many even saying, "you know best what is suited to our soil, climate, etc.," then we must ask the counter question, for what purpose do you want to plant a vineyard? whether for your own table use, for the market or for wine purpose, if for your own use there are many kinds to choose from as you care much more for quality than for quantity, among the favorites on our table I will mention Duchess, Goethe, Lindley, Delaware, Eumelan, Agawam and last in ripening though most delicious the Herbemont. There are many other varieties both

old and new that have their champions, many would not give up the delicious flavored Catawba, and even the old Isabella has its defenders and the plants are sometimes asked for. Next comes the so often asked question, what shall we plant, for market or profit, naturally the proximity to a large city or to a remunerative market, cheapness of freight, express, etc., is a great item. The question of labor, if you can get women and children to assist in tying, pinching, picking, packing, etc., at the required time, must certainly be considered; the cost of posts and wire must be also thought of, and this depends upon the system you favor and the favorite system comes in near relation to your pocket-book, therefore you can well understand that the profit of a vineyard depends on many circumstances besides the varieties you plant. Supposing that all things are most favorable and duly considered I would plant a rotation of varieties both as to color and ripening about as follows:

For early market varieties:

Black Grapes—Moore's Early, Cottage.

Red Grapes—Delaware, Perkins.

White Grapes—Duchess, Empire State, Green Mountain.

For medium market:

Black Grapes—Concord, Worden.

Red Grapes—Agawam, Brighton, Massasoiet, Woodruff Red.

White Grapes—Martha, Moore's Diamond, Niagara.

For late market:

Black Grapes—Herbemont, Merrimack, Wilder.

Red Grapes.—Catawba, Goethe, Salem.

White Grapes—Noah, Greins Golden.

Now please don't misunderstand me, these grapes won't do well everywhere, but as a general selection I think they will give satisfaction; they will not do well anywhere unless they are well taken care of sprayed when necessary and pruned according to the growth and habit of each variety. You may think that pruning these different varieties correctly is very difficult, but in a very short time you will get so familiar with each vine and its habitual growth that the pruning will come to you very easily and naturally.

For wine purposes:

Fine Red Wines—Cynthiana, Nortons Virginia.

Common Red Wines—Concord, Ives Seedling.

For White Wines—Herbemont, Cunningham, Noah, Missouri Riessling, Greins Golden, Martha, etc.

Naturally there are many other kinds that make good clarets, such as Clinton, Bacchus, Black Pearl, etc., etc.

Now a few words as to training the vine, my favorite method is the "Arbor Trellis" as shown in our Manual Fig, 69, it is somewhat more costly in the beginning but saves a great deal of time and work in after years. I consider the spraying of the vine with the Bordeaux mixture a necessity, to a healthy vine, it stimulates the growth, and destroys the mildew on a sickly vine thereby increasing the quantity and size of the fruit. I would like to say much more about spraying, preparing the soil, pruning, planting, wine making, etc., etc., but I do not wish to take your time any longer, but I wish to tell you that practical experience, working and growing up among the vines, training them to suit your own ideas and then enjoying the fruit of your labor is a result all can achieve.

Can you imagine a more enjoyable moment than to go into the grape arbor or vineyard with a basket on your arm plucking the red, white and blue bunches for your family and friends, if the little ones follow you, their exclamations of "O, how good!" "this is best of all!" "what variety is this?" naturally brings a feeling of gratefulness and thankfulness to your heart.

To those that have not experienced this great blessing, I say, hasten and do so, you may then be able to exclaim as one of our German poets say:

"My life is full of joy and love,  
And brightly ringing songs,  
And when they gaily rise above  
To me the world belongs."

## HOW TO SUPPLY OUR STATE WITH GRAPES.

By M. Oliver Cole, Springfield, Mo.

First.—Is the production of more grapes in our state desirable?

As answer to our first query, should we turn our attention to the ocular demonstration of the hundreds of car loads shipped into our State. No one will dispute an affirmative answer. Why send hundreds of thousands of dollars out of our state each year, that our people so much need, if it can be retained? We have evidently conveyed the humiliating impression abroad, that with all our boasting of being the second fruit state in the Union, that we can not, or, Missourians don't know how, to grow grapes.

Ladies and gentlemen, the occasion is opportune "to stand up for Missouri."

Second.—Are our soils suitable?

If our state does not contain better soils than can be found in any other then we have evidently studied the soils of our state in vain.

We shall not detain you at present with a description of ideal soils for the grape. The major part of the intelligences present are already informed, but suffice to say, any good corn soil, other conditions being favorable will produce good grapes.

Third.—Is our climate conducive to the development of grapes of good quality?

We might enter into details, giving humidity and temperature for each of the bearing and ripening months, but successful experiences being absolute evidence we may forego tedious details.

The objector, however, may assert the fact that many years ago the banks of the Missouri river as well as other localities of our state were well represented with hopeful vineyards, but where are those vineyards to-day? They have fallen to decay and virtual extinction. Is this not positive proof that our state is not adapted to the production of grapes of an order sufficiently high to satisfy popular demands?

These results certainly prove something, they afford us the evidence that Americans were not a wine drinking people; also that the effort was

ill chosen in regard to time.

Forty years ago, nay, fifteen years ago western Americans were not a fruit eating people. The yearly increase, however, in fruit consumption is so enormous of late that we can scarcely determine whether to represent that increase by arithmetical or geometrical progression.

Let us for a moment consider actual experiences. In the year 1897 the writer put his first crop of grapes on the Springfield market. A week previous to marketing he conferred with several leading grocers to ascertain how they would prefer to have them served, whether in bulk, large, medium, or small baskets, whereupon one of our leading grocers made answer: "It don't matter how you bring them in, they don't amount to anything anyway; our state is not a grape country." No rejoinder was made, but a week subsequently a load presented itself at his door, when he was requested to come to the wagon. In the interval, while in the store, half a dozen persons had collected about the wagon and had raised the sheet and were bestowing encomiums, as the best grapes by far that had ever been put on our market from any state. The grocer's exclamation was, "I never saw such grapes before." He was kindly invited to recant his former declaration. When shown to an Italian fruiter, he declared, as he admiringly held up bunch after bunch: "No such grapes has ever been grown in this part of the country before.

At the Omaha Exposition, G. A. Atwood requested some grapes. Two samples were taken from a couple of market baskets, no special collection whatever was made from the vineyard for that purpose; the result was, a medal and diploma for the two kinds sent.

Others contiguous to our city are now growing grapes equally good.

Northeastern grapes can no longer successfully compete with our home grown as long as ours last, because they equal ours neither in size nor flavor.

Fourth.—How to plant.

In all the wide realm of fruit growing, mistakes and thoughtlessness are nowhere so apparent as in planting the grape vine.

Reference is made more especially to our own state. Our practices have been but copies from the extreme East where they were first



grown. Conditions have been absolutely ignored. The normal rainfall for the Atlantic states is perhaps three times that of ours during the ripening period of the crops, yet no counter plan apparently has ever been thought of to overcome this seeming western defect. The planting has been done precisely the same in our state as in New York.

Has it ever occurred to our western vineyardists that each square foot of surface soil contains an average number of quarts of water?

Let us assume six quarts to be that average; then the vine planted 8x8 feet will have 64x6 equal 384 quarts of water to mature its crop during a dry season when no rain falls. The vine planted 10x12 feet will have 720 quarts of water for its use, nearly double the former. This difference is sufficient generally to make success or failure of the crop. Another objection equally detrimental is to allow vineyards to be monopolized by grass and weeds which often take as much water from the soil as the vines, thus reducing the water supply at a critical time one-half.

He that would succeed with the grape in our western country, must give heed to the conservation of moisture during the ripening period, by a judicious provision of clean culture and dust mulch.

Fifth.—One of the essentials to success is correct pruning. To lay down a cast iron rule and subject all kinds of grapes to its vigorous exactions is but to invite failure and meet it half way. Some require long pruning, others short. Such as Moore's Diamond pruned to conform to the fan system will yield best results, while the greater number of our present kinds, however, are far better served by the Kniffin, or High renewal systems.

Intelligent planting, pruning, training, cultivating, thinning of fruit and spraying are essentials to success.

Want of space forbids details on this head. A hint to turn the attention in this direction is all that can be given at present. You are requested to consult Bailey on "Training the American Grape Vine."

Sixth.—What kinds to grow?

Though we acknowledge the fact of six hundred different kinds listed and their claims set forth for public patronage, there are not ten among them worthy of commercial planting at the present time.

Let us inquire what we need in order to successfully shut back the Northeastern flood of grapes to our state each season. They should be black and of large size.

For the second week in August we have Moore's Early, for the third week we are hopefully looking forward to Campbell's Early, for the fourth week the McPike we hopefully believe will fill our most exacting expectations.

We need three of ten days each for September, two for October and one for November. Which are they? They are as yet wrapped up in the future to be revealed by the touch of science only.

From this it becomes apparent that nine or ten kinds ripening in order to form a series covering the entire season is absolutely necessary, and of this nine we possess but three. The writer has about fifteen kinds under experimentation with but faint hopes of their filling any of those vacant places satisfactorily.

Seventh.—Hybridizing the creation of new kinds, is the only apparent solution of the problem.

The main object in the preparation of this paper is to call out, if possible the talents of some young or middle age person to thoroughly imbue himself with the importance of the work and to engage in and concentrate his life service to one of the noblest objects offered to human skill and industry.

I put my request in the singular number, there is ample room for haft a dozen in our state to engage in the work. Both fame and fortune awaits him that can evolve but one as good as either the three above mentioned. Yet it is possible for an intelligent undertaking to be rewarded by several.

Missouri can, if she will, produce Burbank.

I would suggest to any contemplating entering this enchanting field of service to thoroughly study T. V. Munson's late publication, the only purely scientific treatise ever written on American grapes, apart from Bailey on training only.

When we stretch our eyes over the vast and fertile plain from Mexico to the British Dominion and from the grand old Rockies to the Mississippi river, the privilege is ours to exclaim to the eastern grape

as did the Divine to the waves of the ocean, to the father of waters: Thus far ye may come and no farther. What a vast field, teeming with millions of souls.

Shall our grand State be the leader and principal in supplying the untold demands for this fruit, or shall we continue in supineness and somnolence and allow the East to reap the rich harvest that by natural advantages belongs to us.

This is a bugle call to action, arise! Awake!! To grasp the golden heritage for us and to our children.

#### Discussion.

Mr. Chandler.—My experience shows Moore's Early to be one of the best. I am not familiar with Hicks, McPike or Campbell. Concord is next to Moore's, Worden third, Niagara fourth, and Woodruff Red fifth. With many varieties I am not familiar.

Sam. Miller.—Those he names are way behind the times. They will never do, I would name Hicks for Concord, McPike for Worden, and Campbell's Early for Moore's, Uncle Sam is a very fine grape.

Mr. Myers.—Moore's Early and Concord are two best with me. Niagara is not wanted in the market.

E. A. Riehl—Two first choice, Niagara and Wilder.

J. C. Whitten.—Best of two hundred tested at Columbia: Moore's Early, Worden, Concord, Goethe, Herbemont, and possibly Brilliant.

Mr. Baxter, Nauvoo, Ill.—We began growing grapes in 1858. We grow them for the money there is in them. For fifteen years we have made money on the Ives and Concord. We can not sell white grapes. When the Niagara was grown in large quantities a car load shipped sometimes did not pay expenses.

Sam. Miller.—I can not grow Niagara.

Mr. Bush.—I name Concord, Worden and Niagara, as three most profitable.

Mr. Atwood.—Moore's Early; can not sell white grapes.

Mr. Hoy.—My choice, Moore's, Worden, Cottage.

Hy. Wallis.—Hicks, Campbell's, McPike, Niagara, Moore's.

## HARVESTING SMALL FRUITS.

By J. F. Bartels, Neosho, Mo.

This is an important part of the business of growing berries for market in fact, success or failure may be the result of how it is done.

Fair, even choice berries may be raised, yet the picking and packing done carelessly and the outcome is failure. Their are so many small details in this part of the business, that it will be almost impossible to outline a plan that will prove a success for many growers.

I regard the proper degree of ripeness of berries most important. Probably the strawberry will require more attention than any other, there is so much difference in the various varieties that it will sometimes puzzle an expert to tell just when they ought to be picked. Thin sunny rows will show colored berries several days before they are fit for picking. Berries are always better colored in this kind of a row. Thick matted rows sometimes show ripe berries perfectly white and overripe fruit only pale red. Very large berries should not be left until colored evenly all over they are generally all right if only half red. This rule will not apply on all varieties.

Medium to small berries should be red all over before they will do to pick, light red or dark according to variety.

No berries should be picked for home use or shipping until their true flavor is fully developed. This rule will apply to all kinds of berries.

Every grower should pick and test; when he finds them as they ought to be, he should see that they are picked as nearly like it as possible. This must be done the whole season through, because conditions change. What is right one day may be wrong the next. The right thing to do is to have only good eatable berries picked, avoid bruising, pack full boxes and put up a neat clean package.

To get good, careful pickers and how to manage them is a rather difficult proposition. The man with the small patch is all right, but the extensive growers are bound to have more or less trouble. When you find a careless picker send him to the woods to pick wild berries. He

will not corrupt others then.

We worked on a plan last season that proved fairly satisfactory. We had a field boss to about every fifty pickers. We numbered our pickers, also strawberry rows, driving a stake every tenth row ten, twenty, thirty, etc. The field boss would note down the number of row by number of picker. For example, row number one, picker number ten, etc. Any time through the day if faulty work was discovered, it could by this means be traced back to the picker that did it. We also had a plan of inspection that worked nicely. The record keeper would put the picker's number on one of the berry boxes of his full tray, set it back and hand the picker another tray with empty boxes. We could tell by this simple method just who picked a certain tray of berries. They may be examined at any time before packing, and only some extra trays are needed to carry out the plan. The harvesting of berries requires care first, last and all the time. Any plan that will improve present conditions is worthy of a fair trial.

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## RAISING THE STRAWBERRY.

By William Burkholder, Sarcxie, Mo.

The first and most essential thing is the selection of the ground on which to locate the berry field.

We are taught that land that will produce corn will produce strawberries—hence it will be necessary to make a wise selection as very much of the land in this section of the country will not produce corn.

After selecting the soil, the next thing is location, by that I mean land that will drain, i. e., land from which all the surface water will drain.

The rows should extend with the drainage. There are those in this vicinity who think the rows should extend north and south—others east and west, each party have some reasons for the advocacy of their particular idea; but my observation and experience have taught me that

that of draining is of vastly more importance than sunshine, as we don't have to furnish the sunshine, nor does the wind always come from the south to assist in the pollenizing. I think that in the cultivation the water should leave the berry patch entirely. I mean the water that stands on the ground until evaporated, wherever it is impeded in its way by any means.

After the selection of the ground, the next thing is getting it in a proper condition by plowing, harrowing, pulverizing and packing.

My observation has taught me that much of the complaint in not getting "a stand" is caused by setting the plants in ground that has not been packed.

A few days of dry weather and hot sunshine will cause them to perish for the want of moisture that could have been had by the ground having been thoroughly packed.

Another essential in raising the strawberry, is the selection of the varieties. I plead guilty, and acknowledge that I don't know anything about varieties, as I have not given them any study. But this much I do know, that for a commercial field, the fewer varieties we can have the better. The Warfield is a good shipper for this section, its tendency, however, is too many plants and small berries—which can be obviated I think. I try to pollenize with perfect varieties that are good bearers of fruit. The Lady Rusk with me, on red land, has done as well as any other variety.

The berry we want is the one that will stand the "racket" in picking, packing and hauling to depot, and then to ride from six to eight hundred miles in the Armour palace coach. You know the railroad people imagine they are going at a funeral gait or at least they tell you that when they want your trade.

Earlier varieties, especially the Michel's Early, has its advocates, but my observation has taught me that it does not do well in the vicinity of Sarcoxie.

Later varieties. The Gandy has done reasonably well, rather a shy bearer, but large and solid, making it a good shipper. I have not had any experience with the Aroma, but parties have recommended it.

Of course, I suppose, men who sell plants have studied varieties and can tell all of their good qualities, but as for myself I will use Warfield and Aroma until some better turns up.

When I get the ground ready and have selected the plants, and have them prepared for setting—by the way, I think late in the fall is the best time to prepare the plants for setting. I stretch a line where I want my first row and then with a dibble and a boy to drop plants I begin to set. I have adopted this plan because all the “other fellows” use it. I proceed to set the plants in the ground thirty inches apart, rows four feet apart, three rows non-perfect and one perfect throughout the ground selected for berries, i. e., if the variety is non-perfect.

In a very few days after the setting I begin to cultivate and continue to cultivate until the growing season is over. It is frequently necessary to hoe to keep grass and weeds out of the hill where it is not possible to get them with cultivator. The plants can be checked very easily in the setting, even without any inconvenience, if the line is used, distances marked on it, so that they can be cultivated both ways early in the season, or until they begin to run.

I think I have written enough to take even a novice to mulching time, which is at the end of the growing season.

Straw, when clear of cheat, makes a good mulch, but if there is the least bit of cheat I would discard it, as cheat is apt to have the supremacy.

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## REPORT OF COMMITTEE ON FRUITS.

We, your committee, would respectfully report that we find upon the tables some 450 plates of most beautiful, large-sized, high colored and most perfect specimens of fruits that it has been our good fortune to have seen at a meeting of the State Society. It is with regret that in awarding premiums, we have not a larger fund at our disposal, that the awards might be in keeping with the merit of the display.

1. Mr. Flourney, Marionville, display, \$10.
2. D. A. Robnett, Columbia, \$7.
3. M. Butterfield, Farmington, \$15.
4. E. J. Jones, Hazle Run, \$10.
5. A. Nelson & Son, Lebanon, \$10.
6. Lippen & Moore, Mt. Grove, \$10.
7. G. T. Tippin, Nichols, \$4.
8. Joseph Gennings, Farmington, \$1.
9. M. J. Berry, Hallsville, .50c.
10. Olden Fruit Co., Olden, \$5.
11. S. H. Leathe, Mine Lamotte, \$1.
12. D. M. Hulen, Hallsville, \$2.
13. R. E. Bailey, Fulton, \$5.
14. L. V. Dix, Jefferson City, \$4.
15. W. R. Wilkinson, Altenburg, \$3.
16. Zeitinger & Bro., Zeitonia, \$2.
17. W. G. Gano, Parkville, \$2.
18. C. C. Crane, Aurora, 50c.
19. W. F. Hoy, Farmington, \$6.
20. H. W. Cook, \$2.
21. R. M. Davis, Bismarck, \$1.

In addition we find an apple the Missing Link on exhibition.

Also a small collection by Mr. Hartzell, of St. Joseph, kept by a process. These apples are claimed to be one, two and three years old.

Canned Goods.—Sweet Corn, Peaches, from Rock Springs, by D. S. Helvern of the Ortis Fruit Farm.

Canned goods by M. F. Beney.

Peaches.—Models of, by Miss Rubert of Junction City, Kan., showing specimens as they appeared during the past season.

Specimens of Tobacco by J. R. Graham, De Lassus.

F. HOLSINGER,  
E. J. BAXTER,  
W. G. GANO,

Committee.

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## REPORT OF COMMITTEE ON FLOWERS.

Plants for decorating the hall were loaned by the ladies of Farmington, as follows, to whom credit is also due for their tasty arrangement:

Miss Buck—Two Calla Plants, one Amaryllis.



Mrs. Tom Hale—One Fern Palm.

Mrs. Dr. Fleming—One Fan Palm.

Mrs. J. Karsch—One Orange plant, four Coleus, one Begonia, one Asparagus, one Lilly plant, one Smilax, one Wax plant, one Oxalis, one Geranium, one Foliage plant.

Mrs. S. W. Grover—Eleven Chrysanthemums in cans, red, white and pink, one cigar plant.

Miss Long—One small Palm, one Orange tree one Lemon tree.

Mrs. Dr. Fugate—One Asparagus, one Rubber plant.

Mrs. M. R. Smith—Five Chrysanthemums.

Mrs. T. P. Pigg—One Fan Palm.

Mrs. E. M. Highley—Five Begonias.

Mrs. J. Brewett—Two Yellow Chrysanthemums, two Purple Flower Foliage, two Foliage plants, one Pink Rose.

Mrs. Mayberry—One Fan Palm.

Miss Wilson—Two Begonias.

MRS. W. T. FLOURNOY,

H. C. IRISH,

MRS. A. Z. MOORE,

Committee.

## REPORT OF COMMITTEE ON RESOLUTIONS.

WHEREAS, An increase of twenty-five thousand dollars has been asked for in the appropriation of the Division of Vegetable Physiology and Pathology to enable the Secretary of Agriculture to extend the investigation on the diseases of plants and to enlarge the plant breeding work. This increase will make possible special investigations of bitter rot of the apple and other diseases of plants. And,

WHEREAS, An increase of ten thousand dollars has been asked for in the appropriation of the Division of Pomology to enable the Secretary of Agriculture to extend our present market for fruits and to open up new ones wherever practicable. The important question of proper picking, storing, shipping and grading will be fully considered. It is believed that a thorough investigation of this matter will be of great value to the entire fruit interests. Therefore, be it

*Resolved*, That it is the unanimous wish of the members of the Missouri State Horticultural Society in annual session at Farmington, this sixth day of December, 1900, that the above recommendations of the Honorable Secretary of Agriculture be granted by the Congress now in session.

*Resolved, further*, That the secretary of this Society be and is

hereby instructed to prepare and forward to the House committee a copy of this resolution.

J. C. WHITTEN,  
C. C. BELL,  
J. C. EVANS,

A vote of thanks was extended to the ladies for the flowers, plants and other decorations in the hall.

Visitors from Kansas, Iowa, Indiana, Arkansas and Illinois spoke a few words of encouragement and gave the members of this Society warm invitations to attend their respective state meetings.

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## SEVENTH SESSION.

December 6, 7 p. m.

## EVENING PROGRAM.

Piano Solo - - - - - Miss Jessie Martin  
Signs of the Times - - - - - Sam'l Miller, Bluffton  
Music—(a) "Old Kentucky Home." (b) "The Fox."

Male Quartette—Messrs. Johnson, Harlan, Fleming, Forsyth.  
Recitation—"Lasco."

Miss Grace Roberts, Elmwood Seminary.  
Insects Destructive to Small Fruits.

Miss M. E. Murtfeldt, Kirkwood.  
Duett—

Miss Lindeman, Miss Buckett, of Carleton College.  
Music—"Bridal Chorus."

Misses Harlan, Blue, Cooper, Marks, Eudie Wilson, Elenora  
and Virgilia Conway, with Quartette.  
An Entomological Trip to Old Mexico, with Lantern Illustrations.  
Prof. J. M. Stedman, Columbia, Mo.

Recitation—"At the Literary."  
Miss Anna Menge, Farmington.

Vocal Solo—(a) "Bonnie Sweet Bessie." - - - Gilbert  
(b) "Talking in My Sleep."

Miss May Harlan, Elmwood Seminary.  
Recitation—"Jonathan's Trip to the Fair."

Miss Anna B. Chandler, Farmington.  
Report of Committee.

"The Star Spangled Banner."

## SIGNS OF THE TIMES AND WHITHER WE ARE DRIFTING.

Sam. Miller, Bluffton, Mo.

When I gave the title of my paper I had not fully considered the seriousness of the subject, but as it has gone forth on the program I will try to make it readable.

When we look around and see the great strides being made in the arts, in sciences and in literature it behooves us horticulturists to see that we are not left in the rear. Most nobly has horticulture kept pace with these lines and the indications are that we will keep even with the best of them as the world moves on. Missouri is not a whit behind the other states in this line, if not really ahead to day. Our premiums at Paris speak for themselves.

Now there is an immense field before us, and the future will show what we can do. That some things can be over done is not impossible. Is the planting of thousands of acres of Ben Davis apple trees safe? Is the planting of Kieffer Pear trees by the million going to prove profitable in the long run? Will not the Europeans want a better apple than Ben, and may there not be a pear equally as good a grower and as free from blight as the Keiffer, of better quality? For me to write this may seem out of place when I was among the first to fruit in Missouri, and advocated it so strongly; but there is a limit to all things, hence this hint to consider the future.

I have a pear tree that is one of three that survive out of an orchard of near 200 trees planted thirty years ago. It was injured by a storm some years back but recovered and is as fresh today as any young tree. The fruit is large, handsome, ripens in September, keeps well, and is to my taste unsurpassed by any in quality. The reply that a friend sent me was like this, "The melting quality of a Bartlett, the sweetness of the Seckel, and the perfume he could not tell, but wished he had budded more of it." This is the pear that Mr. Chubbuck said ought to be grown, if it is not. It may be known by some of our extensive pear growers, but I have not seen it on exhibition.

The grafts were obtained from Marshall P. Wilder of Massachu-

setts, who had imported a lot of grafts from France, whether this is one of them or not I cannot tell. The party from whom I bought the property, had lost the names. This tree has never had a particle of blight, stands in the N. W. corner of the original orchard and I call it Wilder N. W. If spared until another crop, my intention it to send specimens of its fruit to Elwanger and Barry, Chas. Green and others, then if they can not give it a name I shall call it *Lone Star* as it will perhaps be the only one in that orchard in a few years.

I know nothing of the Lincoln, Sudduth, or any of these new ones so highly praised, but do know that this is just what we want for a September and October pear. It is quite likely that if still here next Spring 500 pear stocks will be purchased and all be grafted with this so that in time to come it may not be lost.

There is another subject that is attracting more attention every year, that is the Nut Family. Why shall not these rocky hills be planted with Chestnut, Hickory, Walnut, and even Pecan, which it is claimed will flourish on upland. The great trouble with this class is the difficulty of grafting or budding. But this will be overcome as recently a friend of mine gave me a pointer on this which induces me to invent a machine for the purpose and send a sample to a cutlery firm to manufacture them.

Then the Persimmon is beginning to get a share of attention that it deserves, all these things will be among the coming industries. Here near me are thousands of acres that will never be fit to grow grain on, that will produce nuts of great value. Chestnuts in the east opened on the market this season at \$14 per bushel, now are \$4, even at \$2, and I never knew them to be less, they will pay. The land may be in grass and used for grazing sheep or goats. These are the signs of the time alluded to. Then the time will come when a man can sit under his vine and fig tree and no one to make him afraid. This may be so far as man, beast or reptile is concerned, but he must remember that he must live so that he need not fear the wrath of the Almighty Father.

Now as I have pointed out views of the future, let us look backward and see if we are not neglecting some of the valuable old ones. For instance take the Smokehouse, Rawles, Red Romanite, Yellow Bell-

flower, Winesap, Newtown Pippin, varieties one century old, that are still in their original glory in many places, and then tell me how many of the new ones surpass them in general qualities. Of all the later ones I consider the Jonathan and Grimes Golden about the best. The man that produces an apple equal to the Jonathan, as large as Ben Davis, and as easily grown will be a great benefactor.

I do not wish to prophecy failure, for I do not fear it as I keep apace with the times. The only way is to spray and fight the insect tribes. No plums unless we can control the curculio, which seems hardly possible. Those who are here fifty years hence will know how these things shall be, when such as I will be laid in the shade of oblivion.

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## GROWING AND MARKETING OF PLUMS.

By W. H. Byler, Wheeling, Mo.

I could not have been chosen on a subject of fruit growing of which I know less than that of the plum. But fools rush in where Angels fear to tread.

My experience in plum growing is very limited, which possibly will enable me to write more entertainingly than otherwise. There will be more room for expansion in theory than practice.

This is an excellent fruit that may be prepared in many ways and will pay those owning farms to grow for family use. It has long since been demonstrated that the European sorts will not succeed in the West. In the spring of 1892 I moved on my present owned farm, there I found a thicket of wild plums, a tough willowy looking lot. In lieu of an old tumble down chicken house they served as a hen roost, which did not interfere in the least with a bountiful crop of plums, they were medium in size, small seed, thick skin and of fair quality. They have borne good crops of plums and chickens regularly ever since. They are to the plum family what the colored brother is to the human race; they seem to develop ruggedness of character by holding chickens during the night

time. The curculio had all they wanted, so did the chickens and my wife's relations. I can not tell you much of the history of this very valuable plum, think it was like Topsy, "jess growed," it seems to have no pride of ancestry but great hope of posterity (judging from the sprouts) an old plum orchard of this sort is easily renewed as it needs no expensive or complicated system, just cut the old ones down. I have none of this variety for sale, no propagating rights reserved, would rather let them to be grubbed on the shares. I have another wild sort, most equal to the Wild Goose in size and quality. These wild sorts possess no especial value except for the careless farmer, they are better than none, they will take care of themselves, are sure and hardy and furnish fruit for family use. They may be herded in a fence corner for a while.

When moving on the farm I ordered of a tree peddler two Wild Goose and one Weaver, all proved to be Wild Goose. They were planted on rich soil and grew rapidly with but little cultivation, bore a few plums the fourth year and about ten bushels the fifth; they were sound and of good size. Sold eight bushel in the local market at 25c. per peck realizing eight dollars for the three trees. The following year they bore very unsatisfactorily. They were injured by the severe winter that followed and have borne but few plums since. Two of them are "mighty dead" and the remaining one nearly so; the limbs had a spread of about fifteen feet.

I afterward bought a tree of a local nurseryman labeled "Forest Rose." It is of small growth, bore a few specimens that appeared to be a cross of a hog plum and a green persimmon, and inferior to both parents. It puckers my mouth to look at the tree so I never tasted them. At the same planting I set out two Abundance, they were vigorous growers and bloomed the third year; the fourth they bore a few specimens. They are all one could wish for quality and appearance, but that memorable winter that settled the oldest settler, settled them. Alas! the good die young. I also planted at the same time, a tree labeled Golden Beauty. It has always been in delicate health, and has never borne any fruit. I planted some other worthless labels that I wont mention because I have forgotten their names. They, too, have gone on

before without an obituary.

I have trees bearing a small blue plum that the neighborhood calls a damson. It ripens about frost, is sweet when fully ripe and is much prized for cooking. It is hardy and a great bearer. I believe this can be grown with profit, as the local demand for it is good. I have since planted Ogon, Burbank, Wolfe, Lombard and German prune. The hard winter killed Ogon, Lombard and Wolfe. The remaining have not yet fruited. The Lombard succeeds well here, but is inclined to rot. There is a seedling in this community that resembles Lombard, is a little smaller, very hardy and a prolific bearer. I have a neighbor who planted 2,500 Abundance in the spring of 1893. The severe winter either killed or injured the entire lot. The year previous to the severe winter they bore a small crop of plums and a very large crop of curculio. About 16 to 1. This neighbor had seen this plum growing successfully in New York. So much for Abundance in this locality.

I have never done any spraying or jarring. I believe that poultry running at large among the plum trees is a great help; they afford a fertilizer as well as destroy insects.

I have a neighbor who claims good results from spraying, comparing results on sprayed and unsprayed trees. He did not state the ingredients used or what he sprayed for.

I believe plums can be grown with profit for the local market. Don't know anything about shipping. I have had calls for many times more than I have raised and have sold my combination hen roost plum at the same price as Wild Goose.

So far as my observation goes, stone fruits of all kinds do better on timber than prairie land. My farm is prairie loam.

There are many sorts of plums on the farms hereabouts for family use. So far Wild Goose has been most extensively planted and has given best results.

Last spring, seeing that my Wild Goose trees were dying, I dug from under the branches a number of accidental seedlings and planted them out; they made a fine growth and I have them already set in the vacant places in a peach orchard. Close to the parent Wild Goose trees were growing the wild sorts, Abundance and the Blue plums. They

all bloomed profusely, which would insure thorough pollenization. There are thirty-five of these seedlings and no two of them have foliage and wood of the same appearance. Will report results later on, but don't think I will need very many trade-marks.

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## SOME INSECTS INJURIOUS TO SMALL FRUITS.

By Mary E. Murtfeldt, Kirkwood, Mo.

In this era of cold storage and rapid transportation the small fruits, formerly considered too ephemeral in their character for shipping, have acquired a much greater value and are in much greater demand in large cities and in localities where they can not be produced than ever before. And for whatever there is a demand the supply will be forthcoming. The fruit growing industry, enormous as it is already, promises to increase in magnitude from year to year, not alone in proportion to the increase in the population, but because it is becoming more and more of a daily necessity to everyone.

Were planting, cultivating, harvesting and marketing, the only processes involved in production, the labor would be comparatively easy and the returns assured. But, alas! there is the insect problem and the disease problem and the principal element in both is uncertainty. So much depends each year upon climatic and other less known conditions. The insects and fungi with which the grower contends one year, and learns in a degree to overcome, may be replaced by others the succeeding season with whose habits and manifestations he is unfamiliar and consequently unable to cope.

In a general way the best preventive against both insects and fungi is to change the location of the beds or fields frequently. Fortunately this can be done with but little inconvenience, and if properly managed, with no interval between crops, in the case of the strawberry, blackberry, raspberry and currant, which take the lead among fruits of this class.

Among these the strawberry is unquestionably the ranking fruit.



Encomiums upon its excellence would be trite before this Society where every member has feasted to satisfaction, not to satiety, his eyes, his olfactories and his palate upon its perfections of form, fragrance and flavor. So the enemies to its development will be first considered. And they are not a few. Roots, stems, foliage, buds, flowers and fruit have each its one or more particular foes, while others of the berries work wholesale destruction upon the entire plant. In these notes insect depredators only will be enumerated, leaving to the mycologist the pathology and prescription for fungous troubles. Among the root-eaters the best known and most widely disseminated is the common white grub, the larva of the brown May or June beetle (*Lachnosterna fusca*). This voracious grub is most apt to be troublesome to strawberries set on what had previously been meadow land or pasture, as this insect is more especially a grass-root feeder. It is not, however, discriminating and all tender roots are "grist for its mill," and so, not unfrequently, the luxuriant growth of strawberry fields shows patches here and there of wilted and yellowing plants which, having no anchorage, come up at a touch and beneath which will be found, in its usual coiled position, the fat, white, clumsy destroyer. Its length is about one and a half inches and its thickness that of the tip of one's little finger. The head and collar are horny and brown and there are six long, sprawling legs on the thoracic joints. Its most distinguishing feature is the enlarged, smooth, bulbous hinder end, through which the soil which it swallows with its food shows darkly. This is its appearance when nearly ready to transform after, it is supposed, at least three years of larval growth and when it is most destructive.

The fact that this insect requires several years for the completion of its life-cycle does not mean that it is troublesome only at intervals of years, for there is an annual succession of broods of the parent beetles, and consequently of the larvae in the soil.

There is another white grub frequently found among the severed roots of the strawberry. This is the larva of the beautiful Goldsmith beetle (*Cotalpa lanigera*). Its life history is quite similar to that of the May beetle. Its larva is rather more slender than that of the latter and the posterior end, instead of being smooth, is somewhat bristly.

These grubs can not very well be gotten rid of after their work is recognized, although birds and poultry will always discover them and kill and eat them in great numbers. As previously indicated the best preventive measure is to plant the strawberries on ground that has been cultivated one or more seasons to other crops and change the situation once in three years at least.

There is another root and crown borer which has proved very injurious to strawberries in certain localities in Illinois and other states to the eastward. This is the larva of a small Lineid moth, probably of European origin. The little caterpillar or worm is of a reddish color with horny, gloss-brown head and well developed prolegs. It hollows out quite large cavities in the crown and principal roots within which it lives and feeds, greatly weakening and often killing the plants. The little parent moth, is dark gray in color ornamented with black streaks and dots and has deeply fringed wings. It appears early in July and places its eggs in the crown of the plant from which its larva, upon hatching, bore downward into the roots, working during August and September and passing the winter in the chambers which they hollow out for food, which are afterward lined with silk as a further protection against cold and dampness. The transformations are passed late in the spring. Until about two years ago this insect was supposed to be identical with a small peach twig borer known as *Anarsia lineatella*, which is extensively injurious to young trees, especially in California and some other sections of the country, but it has been ascertained that the strawberry worm is quite distinct. The latter has during various seasons excited alarm by its work in the strawberry fields of Illinois and some sections of Missouri. The application of soot, ashes and lime to the plants during mid-summer has been found beneficial in preventing the moths from placing their eggs upon the plants, but badly infested fields should be uprooted and the plants burned so as to destroy the worms in the crown and roots.

The especial enemy of the foliage of the strawberry is one of the so-called slug-caterpillars, the larva of a saw-fly (*Emphytus maculatus*). This is a black, four-winged fly with two rows of dingy white spots on the back, a little larger than the slug-fly of the rose. This insect comes

out of the ground in the spring and by means of its saw-like ovipositor places its eggs in the leaf stalks and stems of the plant. From these eggs hatch tiny yellowish or grayish-green worms which perforate the leaves with small round holes and, as they grow destroy the entire tissue of the leaves. When not feeding they rest, coiled in a spiral, on the under sides of the leaves and drop to the ground upon the slightest disturbance. They grow to a length of nearly half an inch and then bury themselves an inch or so under ground, where, protected by a very slight cocoon of gum mixed with particles of earth, the first brood, which occurs on the plants in May, rapidly undergoes its transformations and gives forth the flies in June. The progeny of this brood enters the ground and hibernates. It is this second brood that can most conveniently be sprayed with a decoction of white hellebore as the fruit crop has then been gathered and there is nothing to protect against the communication of a bad flavor. Hellebore, in powder, mingled with twice its bulk of air slacked lime or ashes may also be used as can also kerosene emulsion.

Other defoliators of the strawberry plant which are represented more or less numerous in fields or beds in every part of the state are two small leaf folders which turn over one side of the leaf against the midvein or fold it at the center and webbing the edges together form neat little tents, the walls of which afford to the tiny inmates both shelter and food, as they subsist mainly on the green tissue of the inclosed surface. One of these (*Phoxopteris comptana*) confines itself to the leaves, but large species (*Eccopsis permundana*) frequently webs flowers and buds into a ball in the midst of which it hides. After the fruit is gathered infested beds and fields may be cleared of the pest by dusting or spraying with Paris green. A considerable number of cut-worms take toll from the strawberry beds as well as from other plants in the garden and may be reduced by poisonous sprays, by feeding a poisoned bran or corn meal mash, or by trapping with chips, cobs, or bits of carpet placed between the rows or otherwise among the plants. These traps can be examined any time during the middle of the day when the worms found concealed under them are easily destroyed.

An insect that has proved especially injurious to strawberry planta-

tions in Missouri and which from its small size and peculiar habits is seldom recognized as the author of the mischief, is the strawberry weevil or curculio (*Authonomus signatus*). The perfect insect, a true snout beetle, of a almost black, varying to a dingy red color, with a dark spot surrounded with whitish pubescence on the hinder part of each wing cover, is only one-tenth of an inch in length exclusive of the bent-over snout. This species attacks the buds just before they open laying its eggs in them and then completely or partially severing them from the plant at from a half inch to an inch below, the greater number being left hanging to the stalk by a shred of the cuticle. Mr. Chittenden, assistant Entomologist of the Department of Agriculture, who recently made some very careful studies of the habits of this curculio thinks that the buds are severed to prevent them from unfolding and for the purpose of retaining the anthers in a compact mass convenient for the use of the larva which is mainly a pollen feeder. This being the case, the varieties of berries having perfect or staminate blossoms are most subject to attack.

The amount of loss attributable to this insect in some of the eastern states has been estimated, during certain years, to be as much as two-thirds of the crop. The grubs continue to grow for three or four weeks and then transform to pupae and beetles within the hollowed out receptacle of the berry.

The strawberry weevil has a considerable number of natural enemies, including two species of ants which search eagerly for the minute larvae within the fallen buds.

Paris green and other poisonous sprays can be used with safety, as the insect works so early in the season—before the fruit is set. It is recommended to use the green as an addition to the Bordeaux mixture, the latter being applied to prevent the leaf-spot disease to which the plants are so liable.

Within the last two years a new and serious enemy to the strawberry fruit has been discovered in Ohio by Prof. F. M. Webster, Entomologist of the State Experiment Station at Wooster. To make matters worse this pest comes from the ranks of our supposed friends, being one of the large, dark ground beetles, which habitually prey upon other

insects, such as cut-worms curculio larva, potato beetles and other especially injurious vegetable feeders. In 1898 strawberry growers in various parts of the state reported to Prof. Webster much damage to the fruit, both green and ripe, by something that ate off the surface especially the seeds. Investigation always revealed the hulls of the seeds scattered over the leaves underneath, clearly proving the depredator to be a biting insect and not the "true bug" which, from being frequently found on the berries, was suspected of having done the mischief, but the insect was not discovered until the summer of the present year and then only by the most patient and assiduous effort, as it works only at night and hides by day underneath clods of earth or in crevices where, owing to its inconspicuous coloring it is seldom noticed. Prof. Webster having found a number of these beetles hiding near the injured berries made careful microscopic examination of the contents of their stomachs and to his surprise found incontrovertible evidence of their guilt. Later the beetles were found in the act of feeding upon the seeds. In some sections of the state it was estimated that from one-half to nine tenths of the crop was destroyed in two or three days. The seeds are shelled and eaten as nuts, probably as a sort of dessert after a "meat dinner" on insects, or are subsisted on entirely for a few days, as a dietary change. The insect is known as the Murky Ground Beetle (*Harpalus calignosus*) and occurs abundantly in every part of the country. As yet its injurious work has been reported only from Ohio and New York, but we may soon suffer from it in Missouri.

The raspberry and blackberry have most of their insect pests in common. Among these are a root borer which closely resembles in all its stages, the peach tree borer but works more entirely under ground. It is a clear-winged moth with black body, gaily banded with yellow and bears the name of *Bembecia marginata*. This is more especially confined to the raspberry and often, it is said, causes the death of canes, thought to have winter killed. So far as my knowledge goes, it has not done much damage in Missouri.

The raspberry cane borer (*Oberea bimaculata*) is a beetle with dull black wing covers and a pale thorax on which are two black spots. This species is common in Missouri and the larva bores the canes of both

raspberry and blackberry and is, at times, quite destructive to the wood of these fruits. Another cane killer to be found in nearly every plantation in the state is the "gouty gall," caused by a small, slender, black beetle with metallic red thorax. This in laying its eggs, cuts little slits in the bark of the stem, which, as the latter swells from the irritation produced by the larvae, develop into rough longitudinal ridges. The borer inside is white and almost thread-like, with an expanded middle thoracic segment, which shows its relation to the flat-headed borer of the apple tree. The canes on which these swellings are found are invariably killed.

There is still another gall, usually found on the blackberry, which is often two or three inches long, and as large around as a small apple and deeply ridged. This is caused by the numerous punctures of one of the tree-gall flies and if cut open is found to be of small, hard cells, each containing a tiny, coiled grub in process of development. The most practicable remedy for all the cane workers is to look for them carefully in winter and cut out and burn.

The young leaves are often much eaten in the spring by a small, spiny green slug, the larva of a black saw-fly having the size and appearance of the rose slug-fly. Like the latter a few dustings with hellebore powder or spraying with an infusion of the same—one ounce to three gallons of hot water—will kill them.

The larvae of several leaf-roller moths and others of the cut-worm family commit serious depredations on the foliage at times but are only occasionally observed and can be overcome by spraying or dusting with Paris green at any time, except when the fruit is ripening.

The raspberry Geometer (*Synchlora rubriobarica*) is not infrequently a nuisance on the fruit. It is a tiny, looping caterpillar with a spiny surface which it decorates with bits of the leaves, dried flowers, and stamens each stuck on a spine as a sort of disguise. The perfect insect is a beautiful little, bright green moth with white lines and markings on wings and body.

The Black flea-bug and another still smaller, variagated "true bug" are not infrequent upon the fruit of both raspberry and black-

berry to which they communicate a most nauseous flavor and smell. The latter betrays their presence in most cases before the fruit is eaten.

The two insects most destructive to the wood of the red currant in this state are the imported stem borer, the larva of a clear-winged moth (*Nigeria tipuliformis*) and of a native borer which is a beetle larva. These grubs work up and down the stems, checking the circulation of the sap and so weakening them that they usually break off in the winds of winter or early spring and greatly reduce the fruit-bearing capacity of the bushes. In our locality—vicinity of St. Louis—about half the canes were bored by the last named (*Psenocerus supernotatus*) during the previous winter, seriously thinning the rows and entirely destroying many plants. The most effective preventive measure is to look for and burn all infested or unhealthy appearing canes very early in the season before the moths of the one and the beetles of the other have developed.

The principal enemy of the foliage of the currant is the imported currant worm, the larva of a large black saw-fly (*Nematus ventricosus*). This is an European pest, first noticed in this country about thirty-five or forty years ago and which has been known in Missouri for but a comparatively brief period. It was no doubt introduced in the earth adhering to plants brought from some one of the old countries for propagation and as all its natural enemies were left behind, it multiplied with incredible rapidity and devastated the currant fields of the East and North to such an extent that for a considerable period of years, in many localities, the cultivation of the currant was entirely abandoned. In this way it was in a measure starved out and fruit growers having now become familiar with the insecticides most efficacious against it, the currant bush is being reinstated in our fruit gardens and its beautiful and valuable fruit is supplied in abundance in our markets.

The flies appear early in the spring and lay their whitish, oval eggs, exposed, along the midrib and principal veins on the under side of the leaves. These eggs may be looked for before the leaves are quite expanded and much damage can be prevented by plucking and burning those on which they appear.

The first work of the young larvae is to riddle the leaves with round holes, but as they grow they devour all the soft tissues leaving only the

skeleton composed of the larger veins. They feed for two or three weeks and when full grown are about an inch in length, of a greenish color with numerous black dots and spines. They shed this skin and assume a smooth one just before spinning up for transformation. The cocoon is a rather slight one, formed sometimes beneath the surface of the ground and at others among the fallen leaves and litter around the plants. The flies emerge in June and July and soon a second brood of worms appears on the bushes. As the fruit has by this time been harvested the bushes can now be thoroughly sprayed with Paris green or whatever insecticide is most convenient. The first brood should only be treated to such sprays or dustings as are non-poisonous. Of these the most certain in its effects is white hellebore tea, which, though not entirely without toxic properties, has never been known to injure the fruit for human consumption, mainly because it is rinsed off by rains before ripe and partly because hellebore poison is of a rather volatile nature and is soon dissipated in the open air.

A correspondent of one of the eastern agricultural journals advises dusting the bushes thoroughly upon the first appearance of the worms, with very fine, dry, air-slacked lime with which a very little sulphur has been mingled. This he considers quite as effective as hellebore, costs less, and acts as a fungicide on the leaves as well. The fruit of the currant is somewhat preyed upon by the plum curculio and one or two other fruit worms as well as by some cut worm larva, measuring worms and other caterpillars, which eat the leaves also.

During the past season we experienced much annoyance and considerable injury to our currant clusters by a little moth-like leaf-hopper, a species of *Ormenis*, which bred in great numbers on the bushes and by extracting the sap from the stems of the berries as well as by puncturing the fruit caused many of the clusters to develop imperfectly and ripen irregularly. The annoyance of the great quantity of white, sticky, cottony matter excreted from the bodies of the growing insects, which made it necessary to wash a large proportion of the clusters before the berries could be separated for table use or preserving, was of even more importance than the actual injury done the fruit.

This list of the insects that prey upon small fruits is by no means



complete, but includes most of the species that have proved destructive in Missouri, so far as my personal observation goes, or my attention has been called to them by letter. I have also mentioned a few species from whose attacks we have reason to be on guard, as the habits of insects are liable to change, especially in regard to their food and as has been shown, even carnivorous species are capable of acquiring a taste for some of the products of plants.

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### FINAL RESOLUTIONS.

*Mr. President and Members of the Missouri State Horticultural Society:*

We, your committee on final resolutions, beg leave to report the following:

*Resolved*, That for the great success of this meeting the Society hereby tenders its thanks to the citizens of Farmington for their hospitality in entertaining its members, visitors and for furnishing and decorating the hall and for the ride to the mines, which has been tendered; to the local horticulturists for their efforts in our behalf; to those who have furnished the musical and literary features of the program; to the hotels for reduced rates; to Mr. F. P. Graves and the Doe Run, St. Joseph, Mine La Motte, Columbia and Central Lead Companies for their instructive mineral exhibit and souvenirs distributed; to the Missouri Pacific, St. Louis & San Francisco, Ft. Scott & Memphis, Wabash, Missouri, Kansas & Texas and Kansas City Southern railroads for giving us a one-fare for round trip ticket from all points on their roads in Missouri, which we are glad to recognize as a mark of especial interest on their part; to the delegates from other states who have favored us by their presence and all who have contributed to the success of the meeting.

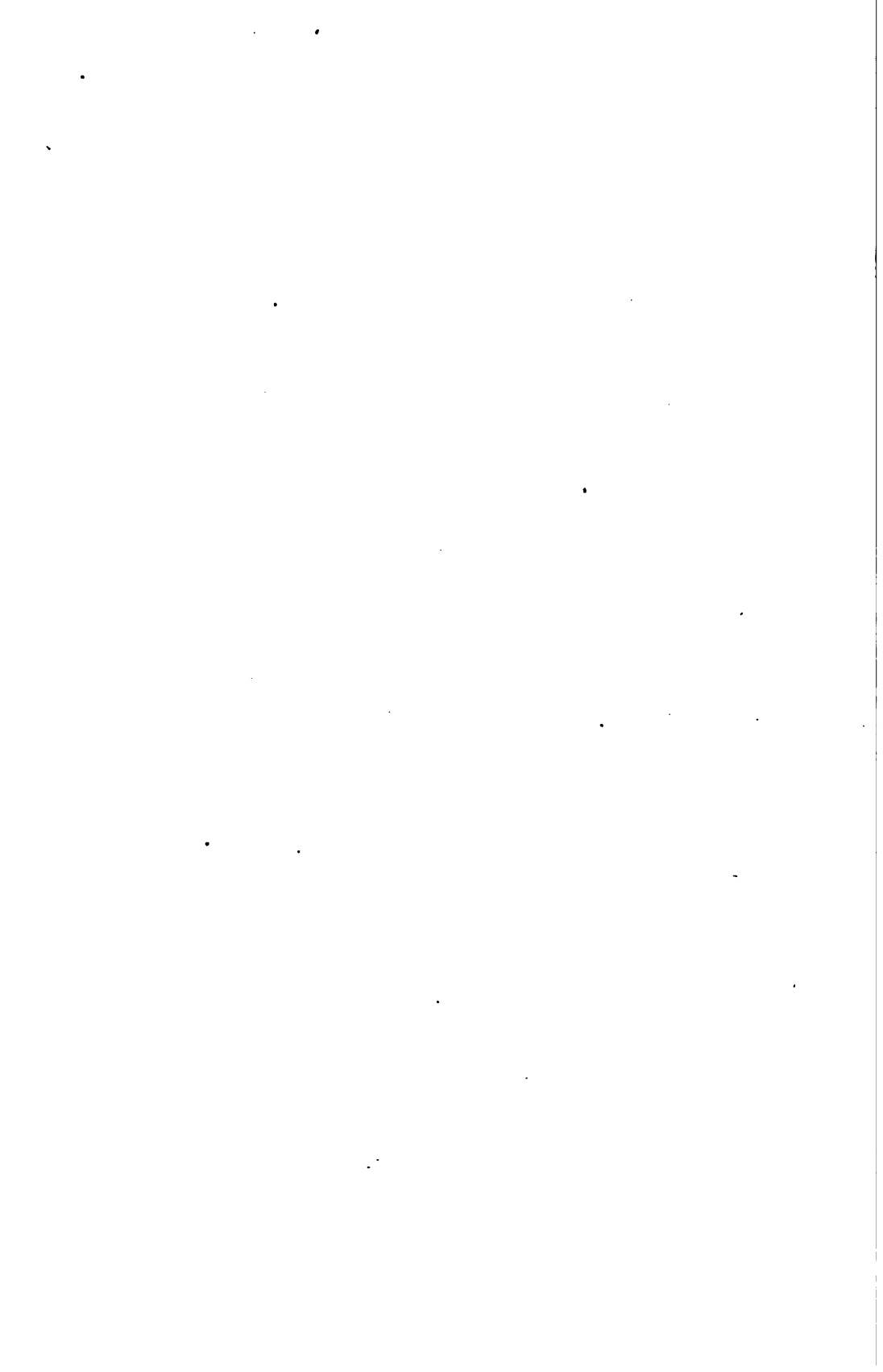
W. R. WILKINSON,  
E. H. RIEHL,  
J. C. WHITTEN.

Committee.

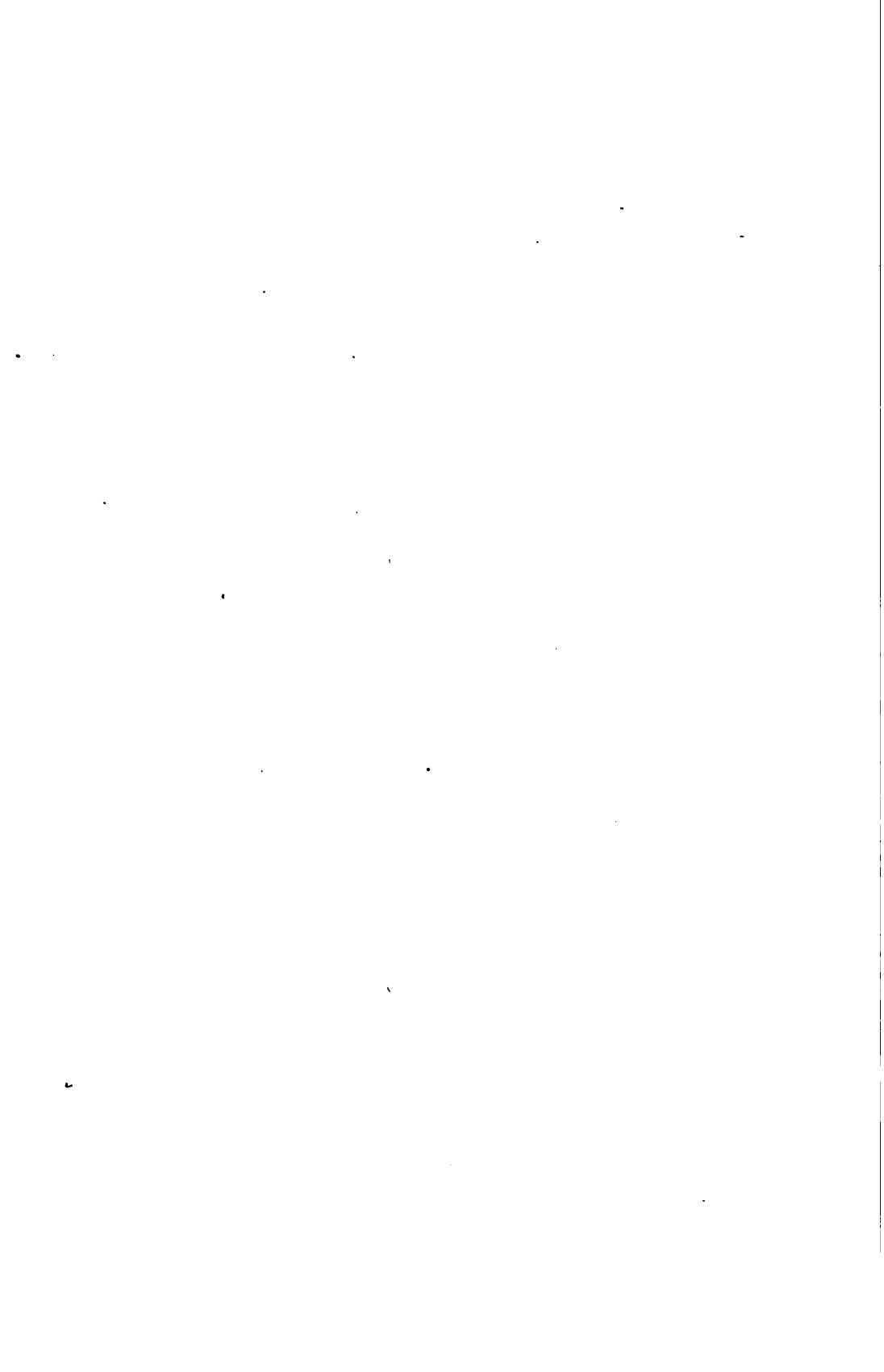
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Last words of J. C. Evans.—I think I voice the sentiment of every

visiting member of this Society, when I say I am glad I came here, to perhaps the very spot where De Soto pitched his tent when he was exploring this country and looking for gold. I love to go to the country where the poplar, the ash, the elm and the sugar tree grow. This is good land. I was surprised to find so nice a town here. I am charmed and gratified at the way you have taken care of all these people. I thank you for the happiness you have given us.



# MISCELLANEOUS PAPERS.



## MISCELLANEOUS PAPERS.

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### THE DESTRUCTION OF BIRDS.

By Sara Thorp Thomas, Pulaski County, Ark.

Comparatively few are aware of the extent to which birds are being destroyed over the whole world, or of the disastrous consequences if this slaughter is not stopped by public opinion and legislation. A French naturalist has computed what the ravages of insects would be, if unchecked by their natural enemies, the birds, and finds that "the earth would be uninhabited at the end of nine years, in spite of all the sprays and poisons that could be manufactured for the destruction of insects. They would simply eat up all vegetation." The unreasoning heartlessness of fashion is responsible for the greater portion of bird murder, and the enormous demand created for this "murderous millinery" sends organized bands of men even into the wilds of countries, still inhabited by savages, to slay these innocent, beautiful creatures. "Plume hunters," as they are called, employ the natives to kill birds for them, and one who was carrying on that business in a South American forest complained because they killed so indiscriminately that it was often necessary for him to pick over a wagon load to get the few he wanted. This year there were shipped from Venezuela alone one and one-half million of dead birds. The splendid species of the tropics are especially sought for, both in Africa and South America and some are already becoming so rare that their price is greatly increased while their final extermination is certain if this fashion is not abolished, which is worse than heathenish, because its followers profess to be civilized; yes Christianized—when savages wear them they do not claim to be either.

The destruction of birds is pursued as ruthlessly in the United States as elsewhere. Forty thousand terns were killed in a single season on Cape Cod, and a million and a half rails and reed birds near Philadelphia; in fact the beautiful herons once so numerous in Florida have been almost exterminated for the sake of the plumes called aigrettes, which are worn only at the nesting season. A hunter boasted that he had killed 300 in one afternoon. By careful estimate it has been determined that it takes two hundred million birds to annually supply the demand of the women of the civilized world.

Entomologists say there are at least 400,000 different kinds of insects, and that one insect alone in a single year may become the parent of six billion descendants. With these astonishing powers of increase it is impossible not to see what destruction they will cause vegetation when not kept in check by birds, which are especially adapted for this work by their Creator. A pair of robins were watched while they carried 3,000 earth worms to one brood. One pair of purple martins fed their young 2,000 insects in one day. The sparrow feeds its young 36 times in an hour, for 14 hours a day. Almost without exception every small bird eats at least one-sixth of its own weight of food in 24 hours; which, supposing that human beings fed on the same scale would mean that a man ate 25 pounds of food in a like time. And this food of the birds consists almost entirely of the worst foes of agriculture.

Mr. Lawrence Bruner says of the red-winged black bird: "Several years ago the best fields in the vicinity of Grand Island, Neb., were threatened with great injury by a certain caterpillar that had nearly defoliated all the beets in many of them. About this time large flocks of this bird appeared and after a week's sojourn the caterpillar plague had vanished." There is no bird whatever that has not been proved to be more or less beneficial to the agriculturist, though superficial observers have condemned some species for the little damage they do, leaving out the good they accomplish, which would more than balance the harm.

We do not expect those whom we employ to work without wages or a supply of food, neither must we be so unreasonable toward our

helpers, the birds. With hardly an exception those birds that eat cultivated fruits prefer wild varieties if they can get them, but when the farmer clears his land of all these as far as possible, he must not be surprised if his little servants help themselves to what they can find, particularly when they have saved it by destroying insects which would have made it valueless. Plant ever-bearing mulberries, leave wild cherries, bitter sweet, holly, wild grapes, poke berries, etc., etc., just as you provide food for other animals in your service. The winter food of insect-eating birds is largely the larvae and eggs concealed in the bark of the trees and other places where none but a bird's eye can see them, and nothing reach them but a bird's bill, but they also consume an enormous quantity of weed seeds. Prof. Beal calculates that the little tree sparrow in Iowa alone destroys 1,720,000 pounds of noxious weed seeds every year. Those who have studied this subject say that farmers, fruit growers, and gardeners lose \$200,000,000 each year by the ravages of insects; that is to say one-tenth of our agricultural products are destroyed by them. It is only necessary to mention in this connection what the Gypsy moth has cost three counties in Massachusetts. Besides the damage to vegetation, the state has annually paid \$100,000 to corps of men under the leadership of those who have made the insect a study, and these assistants undergo a rigorous examination to test their sight, as they must be able to distinguish the clusters of eggs and other signs of their presence in the loftiest trees.

It is time that farmers with one voice demand laws to protect their best friends, the birds. Prohibit the importation, sale, or keeping for sale, birds' feathers or parts of birds, and forbid wearing them. Ornithologists, entomologists, scientific Audubon and humane societies have all tried to instruct the public, which have been warned of the consequences, and implored for God's sake and sweet mercy's sake to stop the barbarous slaughter of birds, but in vain. Now let the toiling farmers and horticulturists speak out and refuse to pay the tax levied by fashion of one-tenth of all they raise. Why should they be compelled to buy spraying devices and insecticide when the birds that are slain would do the work far better?

Appeal to your State Horticultural Society, which ranks with the



best in the United States, to take this important subject in hand and see that the legislature passes laws which will relieve you of the incubus of a fashion which is a curse to humanity, as well as all nature.

The foregoing earnest and excellent article should be pondered by all our readers. The Missouri State Horticultural Society which, as Mrs. Thomas says, "ranks with the best in the United States," could undertake no work which would be of more practical benefit, not to horticulture alone, but to the world, than to inaugurate a systematic and vigorous warfare against the heartless destruction of birds now going on so ruthlessly. We will be glad to hear from others on the subject that Mrs. Thomas has so forcefully presented.

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#### NOTES FROM THE RURAL GROUNDS.

"Blossom Birds."—With the opening of the apple blossoms there regularly appears a multitude of tiny, active birds that flit through orchard and woodland, incessantly searching for minute insects, such as prey on the opening buds and unfolding leaves. They are often dismissed as "chippies" by the unobservant, but are also termed "Blossom Birds" by those who can distinguish them from resident species. Most of these graceful little birds belong to the extensive family of wood warblers, of which over 100 distinct species have been found in the United States. They are the most useful birds imaginable, as they feed entirely on insects that are in some way injurious to trees and shrubs, but their small size and rapid passage northward, together with their habit of frequenting the tops of rather tall trees, tend to make them little known. Some are very richly colored, and nearly all have agreeable little songs. Dr. Elliott Coues, a great authority on North American birds, says in one of his books, "With tireless industry do the warblers befriend the human race; their unconscious zeal plays due part in the nice adjustment of Nature's forces, helping to bring about

that balance of vegetable and insect life, without which agriculture would be vain. They visit the orchard when the apple and pear, the peach, plum, and cherry are in bloom, seeming to revel carelessly amid the sweet-scented and delicately-tinted blossoms, but never faltering in their good work. They peer into the crevices of the bark, scrutinize each leaf, and explore the very heart of the buds, to detect, drag forth, and destroy those tiny creatures, singly insignificant, collectively a scourge, which prey upon the hopes of the fruit grower, and which, if undisturbed, would bring his care to naught." There may be room for debate whether the crow, the robin or the catbird are really beneficial to the farmer or not, but there is no question as to the good services of the lovely little wood warblers. Don't let anyone shoot them in your orchard or wood lot.

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## ONE OF THE GLORIES OF HORTICULTURE.

By Samuel Miller, Bluffton, Mo.

Do I get lonesome out so early in the morning? How could I when the songs of seventeen different birds are heard around me! The voice of the gentle dove alone compensates. But it must not be supposed that I go out this early with an empty stomach. That would soon use me up. A glass of lemonade and a piece of bread or a few crackers are just the thing until breakfast is ready about 6 a. m. There are two and only two kinds of birds that can't stay here—the English sparrows and the blue jays. The former because they tried to drive the blue martins away from their boxes, and the jays because they rob the nests of our innocent ones. The sparrows have never yet got a foothold here, although the cornice on my house would be a suitable place for them to build in. Of course my strawberries and cherries will have to pay for some of the pleasure these birds give us. Here let me tell a trait of the martins. Only one family in this whole

neighborhood raises cabbage successfully and I attribute it to their having martins. They are the only bird that catches the white butterfly, the parent of the cabbage worm. Just while I am writing the martins are warbling around. Among my favorites is the Baltimore oriole. The allusion to the cabbage worm may induce some to put up boxes for the birds.

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### THE RETURNS TO BE EXPECTED FROM AN APIARY.

Although apiculture is extremely fascinating to most people who have a taste for the study of nature, requiring, as it does, out-of-door life, with enough exercise to be of benefit to one whose main occupation is sedentary, the income to be derived from it when rightly followed is a consideration which generally has some weight and is often the chief factor in leading one to undertake the care of bees. Certainly, where large apiaries are planned, the prime object is the material profit, for they require much hard labor and great watchfulness, and the performance of the work at stated times is imperative, so that in this case there is less opportunity than where but a few colonies are kept to make a leisurely study of the natural history and habits of these interesting insects, because—unless the keeper is willing to forego a considerable portion of his profits—his time must necessarily be almost wholly taken up in attending to the most apparent wants of his charges.

One very naturally supposes that the return from a single hive, or several of them, in a given locality, may be taken as a fair index of what may be expected each season. Such return, if considered average, may serve as a basis on which to reckon, but as so many conditions influence it great differences in actual results will be found to occur in successive seasons. Apiculture, like all other branches of agriculture, depends largely upon the natural resources of the location, and the favorableness or unfavorableness of any particular season, no matter how skillful the management, may make great differences in the year's

return. The knowledge, skill, industry, and promptness of the one who undertakes the care of the apiary have likewise much to do with the return. Furthermore, profits are of course largely affected by the nature and proximity of the markets.

A moderate estimate for a fairly good locality would be thirty to thirty-five pounds of extracted honey or twenty pounds of comb honey per colony. This presupposes good wintering and an average season. When two or more of the important honey-yielding plants are present in abundance and are fairly supplemented by minor miscellaneous honey plants the locality may be considered excellent, and an expectation of realizing more than the yield mentioned above may be entertained. With extracted honey of good quality at its present wholesale price of 6 to 7 cents per pound and comb honey at 12 to 13 cents, each hive should under favorable circumstances give a gross annual return of \$2.50 to \$3. From this about one-third is to be deducted to cover expenses other than the item of labor. These will include the purchase of comb foundation and sections, repairs, eventual replacing of hives and implements, and the interest on the capital invested. By locating in some section particularly favorable to apiculture—that is, near large linden forests, with clover fields within range, supplemented by buckwheat; or in a section where alfalfa is raised for seed; where mesquite, California sages, and wild buckwheat abound; where mangrove, palmettoes, and titi; or where sourwood, tulip tree, and asters are plentiful—the net profits here indicated may frequently be doubled or trebled.

But these favored locations, like all others, are also subject to reverses—the result of drouths, great wet, freezes which kill back the bee pasturage, etc., and though some years the profits are so much larger than those named above as to lend a very roseate hue to the outlook for the accumulation of wealth on the part of anyone who can possess himself of a hundred or two colonies of bees, the beginner will do well to proceed cautiously, bearing in mind that much experience is necessary to enable him to turn to the best account seasons below the average, while during poor seasons it will take considerable understanding of the subject, energetic action, and some sacrifice to ride over,

without disaster, or at least without such great discouragement as to cause neglect and loss of faith in the business. On the whole, there should be expected from the raising of bees for any purpose whatever only fair pay for one's time, good interest on the money invested, and a sufficient margin to cover contingencies. With no greater expectations than this from it, and where intelligence directs the work, apiculture will be found, in the long run, to rank among the best and safest of rural industries.—Farmers' Bulletin No. 59.

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### ANGRY BEES AND STINGING.

The remark is often made "bees always sting me if I go anywhere near them." I am inclined to think this is due largely to the imagination and not the bees, writes F. W. Green, in Brookfield (Mo.) "Gazette." Many people when bees are flying around them think that they are hunting a place to sting you, when the fact really is they are most probably hunting something to carry home to store up for winter. Bees are the gentlest and most docile of all animated creation. You can tear their homes to pieces or take all their honey and leave them to starve and they will not resent it, but with all patience will go to work and endeavor to repair the damage done, provided you handle them right.—Colman's Rural World.

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### THE BEE-HOUSE.

By B. J. Chrysostom, Notre Dame (Ind.) University.

House apiaries are not generally popular with specialists or those who make the production of honey a business. When, however, all

reasonable objections have been obviated by improvements—then will they become popular on account of the saving of labor and money, together with better results obtained. One great objection has been removed by this hive because the uniform high temperature inside the hive is most desirable for early brood raising, as it is protected from sudden and severe changes in the weather. It also settles the wintering problem which has so vexed many of those engaged in the business. Another objection is likewise removed by the construction and cheapness of the building. The loss of queens and other inconvenience to the bees may be remedied by building the house with eight sides—large enough for three hives to each side. This house is further improved by a board about three feet wide at each corner. This serves as a wind break, and for many other purposes of minor importance. There is one of this description here on the grounds. It is a frame with walls one inch thick, and gives entire satisfaction.

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## BEES AND HONEY.

Between the blossoming of the fruit trees and the coming of a good honey supply from any other source there is usually a season when the bees obtain but little honey, says the "Ploughman." They do not store a large amount from fruit blossoms, but it is enough to feed them well and induce them to breed rapidly. If they do not have a surplus when the apples blossom, it will happen at the end of the bloom, they will have a considerable amount of brood and brood comb, and a queen that is in good condition to go right on depositing eggs if she is kept supplied by the other bees with food.

If she is not she stops laying and the stores are used for the brood, often proving insufficient, and resulting in loss of brood by starvation. Certainly it results in the colony ceasing to increase until there is a new source of obtaining honey. It would undoubtedly be profitable to

feed at this time, giving a supply of sugar syrup every day until it is found that they are obtaining honey from the fields again.

This should result in a large and strong colony, and possibly in swarming early. It is the old queen which goes out with the swarm, and if she gets well established with combs or foundation which she can quickly fill with brood, she may lead out another swarm from her new hive. Such a swarm would probably be better than a second swarm from the old hive.

Yet it may and often does happen that the colony in the old hive will send out its second swarm in eight or ten days after the first one left. It would be better in most cases to prevent this by cutting out any queen cells left after the swarm has gone, and that may be built there, and to encourage storing of surplus honey instead. The young queen left in the old hive after swarming may be in such haste to go as to result in two small and weak colonies, not as valuable as one strong one, and in a necessity of feeding both, while if kept from swarming, the entire colony may store a good amount of surplus honey, besides its winter supply.

To gain one new colony from the old one is doing well, and often two good ones may be obtained in a good season, but to increase four-fold is likely to result in the loss of one, at least, before winter ends, unless much care is taken and food given.

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## BEES AND SPRAYING—A WARNING.

By E. P. Felt, N. Y. State Entomologist.

The Albany "Argus" of May 22 contained a brief account to the effect that many honey bees had been killed at Medusa, N. Y., by visiting trees sprayed while in full bloom with an arsenical poison. It was stated that one beekeeper lost his entire colony of 100 hives, valued at \$500. The report was investigated, with the following results:

Several men sprayed their fruit trees on Friday and Saturday, May 18 and 19, the former being a bright day. Trouble was first observed on the 20th. Of the condition of his apiary on that day, Mr. W. P. Makely writes:

• "The sight that met my eyes was enough to paralyze any bee man. In front of each hive lay the full working force of the bees. Some in clusters apparently dormant, and others wiggling about as if in great agony. With the appearance of the sun there was a general movement among the bees in an effort to get as far away from the hive as possible. Those that had the strength would try to fly, but could only succeed in making three or four feet before they would drop to the ground. The next day, Monday the 21st, I opened a few hives and found all the workers gone, and a large amount of brood and but few young bees left. I think that most of the swarms will pull through, but our honey crop is gone and we can expect no swarm."

Mr. Makely estimates that practically all the field-workers were lost. Mr. Edwin Snyder claims to have lost between 80 and 95 per cent of his workers in his 90 to 100 swarms. Mr. Aaron Jennings has from 200 to 225 swarms, and the first serious consequences were observed on the 23d, when in the vicinity of more than half his hives he could scoop up handfuls of dead or dying bees. Orchards were sprayed on the 21 and 22 1-2 miles north and the same distance northwest of this man's place. A large quantity of dead bees have been received at my office, and they will be analyzed for the presence of arsenic. The destruction was fearful, and there is every reason to think that it was due to poison thrown upon trees in blossom. There is at present a law prohibiting the spraying of trees while in bloom; and this deplorable experience certainly indicates the wisdom of its remaining on our books and being enforced to the letter. There is a strong sentiment in some sections of the state in favor of spraying trees while in bloom, but practically every economic entomologist contends that all insects can be controlled just as effectually by spraying just before or after blooming, and in many cases the result is much better. It has been demonstrated beyond all question by experimental methods that honey bees can be poisoned by visiting sprayed blossoms; but this is the first case known



to me where widespread destruction has resulted under strictly natural conditions, most probably as a result of spraying. This case will be closely watched.—Colman's Rural World.

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### BEES AND HONEY.

Dr. Miller says a beekeeper should be provided with about 100 sections for each colony. He may not have use for so many, but in a good season, when they may fill 75 sections or more, there would need to be some extra, which will only be partially filled. Many a pound of honey is lost, he says, because supplies were not obtained in time or in sufficient quantity. A pound of thin foundation is about enough to fill 100 sections with the full sheets, which he considers better economy than to use only starters, and as it costs but 50 to 60 cents a pound, the difference between the full sheet and the narrow starter is but a small item.

At the Ontario Beekeepers' Association meeting in Toronto much was said that should interest beekeepers elsewhere, and we propose to extract a little from the comb in which we find it. In an essay on "Marketing Extracted Honey," the writer suggested that beekeepers should combine in selling their honey. They should not advertise that they have a heavy crop, nor begin to sell too early in the season. Should post themselves in regard to market prices. Supply local dealers first at a fair rate, then if any must be sold to wholesale dealers, let them have it at ten per cent less, which will keep retail prices steady. He thought one reason for low prices was the sale of honey at the fall exhibitions when prices were low, as it was too early for brisk demand. Another speaker advocated never selling honey which did not weigh 14 pounds to the Imperial gallon. Granulated honey if unripe will sour because of the excess of water in it. If fully ripe it will granulate but not sour.

A wax extractor was described, which it was said got one-third more wax from old combs than any other. The wax must be at a high temperature. A slatted platform is put in a metal box, which has a spout for carrying off the water and wax. On this platform put a piece of coarse bagging large enough to fold over the edges and top of the wax and hot water when it is put in. After this is done, put on another slatted platform, then a heavy iron top, which is to be forced down with a screw. The wax obtained by this process is rather soft.

Professor Robertson said it is of no use to send poor honey to England. First-class honey sells at fifteen cents a pound there and poor honey as low as four cents. He liked to send honey in glass, but if it could be sent in 60 pound cans so that the dealers could put it into glass over there it would be more satisfactory.

A writer told how he managed in extracting season. He first furnished supers with drawn comb to overcrowd colonies, then to those less crowded. He placed queen excluders in new swarms. In old colonies the combs are generally filled with honey before the queen finds her way into the super. When supers are filled, honey is extracted; carefully removing cover and quilt, he uses a little smoke to drive bees down. The supers are then removed, bees brushed off in front of the hive, and empty combs put in, repeating the process as often as supers are filled. As the honey flow from buckwheat and golden rod diminishes, he removes supers altogether, extracts the honey, and leaves supers outside for bees to take out any honey left in the combs. Each day all the honey is taken from the extractor and put in storage tanks, over which are two thicknesses of cheese cloth to catch any drippings from the comb.

The question box brought the following answer: Queen and drone traps may be of some use in small apiaries, but are no use in large ones. The advantages of clipping queens is in preventing the bees ascending and facilitating the handling of the bees when several swarms come off at once. Allowing bees to clean out the extracted combs after the last extraction left combs clean, and if left out until clean and removed at night, there is not much danger of robbing. This

is the best way to handle combs which have a small quantity of honey in the fall.

The drone progeny of a queen were thought to take after her sire. The best method of handling swarms so as not to increase the number of colonies, is to hive them on half-comb and half-foundation frames. Put the new hive alongside of the old one, and shake all bees from old hive into new one, then keep the old one for living a new swarm. In managing bees in out yards for extracted honey, go out once a week, lift off the supers, and if the bees have started cells, shake them off into a new hive with foundation. This prevents the swarming. One man leaves bottom boards off from June to September, and puts a screen on top and bottom.

The dairy and food commissioner of Minnesota says that some beekeepers there are wintering their bees in a warm room and feeding them on maple sugar, cane sugar, corn bread and plenty of glucose so that they are storing honey all winter. It is adulterated honey just as much as that which has been manufactured by mixing glucose with extracted honey. Now he can not arrest the bees for making adulterated honey, but he would like to have a law that would permit him to punish any one who sells honey made in that way. We hope he may get it. If he does, those who have practiced it may find punishment for what they have done in loss of their colonies, as it is said that bees that have been fed so for any length of time will not afterward extract the nectar from flowers, having lost either the will or the power to do so.

Many beekeepers feel it their duty to destroy any king-bird seen about the apiary, as much as poultry keepers would a hawk or a fox around the chicken yard. But if the report of our Agricultural Department is correct, this is a mistake. They examined the stomachs of 281 king-birds shot in different parts of the country, and found bees in but 14 of them. In these there were 50 bees, of which 40 were drones, four were workers and six could not be identified being too badly broken.

There was then only a possible ten worker bees to 281 birds. On the contrary, there were 19 robber flies which often do much damage

among bees. There were beetles such as those whose larvae are the wireworm, the plant-eating grubs and the various cut worms, the cut worms themselves, caterpillars, grass hoppers, grain weevils, leaf hoppers and other insects injurious to fruit and grain, with some wild berries and grapes.—American Cultivator.

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### PREPARATION FOR A STRAWBERRY BED.

By R. M. Kellogg.

Every small fruit grower should plan his work in advance two or three years, and be his own nurseryman and propagate his plants so as to get the very best results. Strawberry plants should be grown in a special plat from carefully selected plants, which show a tendency to form strong fruit buds. The propagating bed should be sprayed with Bordeaux mixture immediately after the plants are set, using the atomizer sprayer so it will go to the plants in the finest mist. It will destroy every spore of rust and leave the foliage as clear and waxy as the newest growth.

For several years I tried to eliminate this disease by selecting plants that would resist it. We all know it is a fungus growth and under favorable climatic conditions will spread very rapidly. Some varieties are more susceptible to it than others and these are our most productive sorts when kept free from it. This year we have sprayed every ten days, using a cart with an Eclipse barrel pump sprayer, with three nozzles, taking three rows at a time.

The other day I offered a visitor a dollar each for every leaf he could find on the farm containing a live spot of rust. Although diligent search was made he did not replenish his bank account by finding a single leaf. It is well-known that strong fruit buds or roots can not be secured without healthy foliage and plenty of it. Rust is propagated by spores and if all these are killed in the propagating bed we

shall have little fear of our crop being lessened or destroyed by it in the fruiting field.

Another advantage of propagating plants in a special bed is that they can be kept dormant by mulching lightly as soon as the ground is frozen slightly and then in mid-winter when the ground is frozen deepest, cover several inches thick with fine chaff. You can thus keep the frost in the ground and prevent them from starting until your beds are plowed and fitted. No matter how hot the sun may be, a dormant plant set in the ground will grow vigorously, where one loaded with a mass of green foliage would surely perish. Another feature of the propagating bed is the blossom buds should be removed before they are open so as to prevent the great strain of pollen secretions at a time when they have no roots to sustain them. Potency of pollen is of the utmost importance in the development of fruit and a plant once exhausted does not soon recover. The cost of removing the buds is no more than when done at a later time and you will find results very satisfactory.—Farmers' Review.

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## PREPARING LAND FOR STRAWBERRIES BY GREEN MANURING.

By J. R. Mann.

It may be said that land is good for strawberries in proportion to the vegetable matter it contains. Such soil holds moisture better, stands drought better and is in all ways better fitted to make fine strawberries and bigger crops of them.

The soil can be stored with vegetable matter cheaper and quicker by turning under green crops than any other way. Clover is the thing at the North, but at the South or as far north as they will grow, and they thrive farther north than is generally believed, peas beat the world.

As soon as my strawberry fields bear one full crop, which is the second spring after setting, I plow under at once, run off rows three feet apart and drill in peas at the rate of one bushel to the acre, covering

lightly. The peas are plowed twice to keep down grass and give them a start. No hoe work is ever given.

In a few weeks the ground is covered, shading it from the hot sun, much to its good.

As soon as the peas begin to grow good I turn under the vines. If turned under too soon they are too watery, if too late it is not so good. As soon as the vines become tender from decomposition I break the land again and it is ready to plant in strawberries.

Thus treated land will never "berry out" but make finer and finer berries and more of them every year. The cow-pea is a God-send to the South and especially to the southern strawberry grower. In no other way can land be improved as cheaply and thoroughly. All crops grow well after peas. The strawberry grows especially well after them. The pea seems to leave the soil just right for them. It pays me to also use lime after turning under the peas. I use from half a ton to a ton to the acre of cheap agricultural lime. The lime might not pay on all soils. Better to experiment.—Strawberry Specialist.

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### A STRAWBERRY PATCH.

By S. H. Van Trump, Lawson, Mo.

I want to call the attention of the readers of the Journal to the question of the strawberry patch. Less than ten per cent of the farmers of the Mississippi Valley grow the strawberry for family use and yet there is nothing that will add more to the health, comfort and luxury of a rural family than a plot of ground sixty feet square within the kitchen garden planted to strawberries. If space for the strawberry patch can not be had in the garden, then some equally good plot should be selected where it will be out of the range of poultry and pigs. Now is the proper time to lay plans and make arrangements for the patch we expect to plant next spring. And first in the matter of selecting soil, great care should be exercised to get one that is deep, well drained and warm. This kind of soil will contain much sand, or sand and gravel, and very little

if any clay. Having secured the nearest an ideal strawberry soil at our command we should proceed to bring that soil to a high degree of fertility by spreading upon it well fermented barnyard manure at the rate of twenty good loads to the acre. If the planting is just a small one as above described, the cleanings from the fowl houses and yards will be found ample in quantity and of excellent quality for the purpose. This should be applied to the soil any time during the winter months so it will be given time to thoroughly dissolve and leach down into the depth of the soil by spring. Next now will come the spading or breaking and overturning of the soil for early spring planting. For family patches this should be done with a garden spade and to the depth of from four to six inches. Each spade full of dirt should be turned completely over and pulverized. Of course spading or breaking the soil should not be attempted until it is thoroughly warm and dry. After the soil has been upturned by the spade, it should be gone over with a fine tooth steel rake and made fine to the last degree. This fining of the soil with the rake should be to the depth of three or four inches and should by no possibility be neglected because it is the essential element in securing a stand of plants. The soil is now ready for marking off and planting. For a small family patch this can best be done by stretching a wire very firmly the length of the patch north and south. The plants are then to be set by the side of the wire at a distance of two feet apart. If the rows are then placed the proper distance of two feet apart it will give us 900 plants to a patch of sixty feet square. In setting the plants great care should be exercised to do the work properly, as the life and future of every plant depends upon that precaution. Take the plants fresh and moist from the vessel in which they are carried and spread the roots out like a fan over the fingers of the left hand, holding the crown of the plants beneath the thumb. Now with a trowel or dibble open the soil to the depth of two or three inches and with the left hand deposit the plant in the soil, allowing the crown just to show above. Next make the soil very firm about the plant and all is well done.

Hereafter comes the cultivation and management of runners. Not a weed should be allowed to grow from the start, and the soil should be kept loose and fine by raking with the steel rake once or twice each week.

This system of cultivation not only proves death to all weeds, but affords the very best mulch to maintain the moisture and fertility of the soil. Cut off the first set of runners that appear, and from the second ones, which will be stronger, get your increase of plants. These runners should be kept raked from the center of the space between the rows, and made to fill out the rows to something near a foot in width. If each virginal plant makes us eight good strong plants it will give us a total of 7,200 plants, which is quite as many as our soil will be able to sustain. These plants should be allowed to form during the month of June, and afterwards all runners should be closely removed. This will give the plants set an opportunity to make a fine growth and become well rooted, and thus equipped to stand the drouth of August and September. Such plants from strong and abundant fruit buds will bear many times more fruit than the small plants set in August and later. Cultivation of the strawberry patch should continue as long as the weeds continue to grow, and when winter comes and seals up the farmer's furrows, our little plot 60x60 should be just as free from weeds as on the day we planted it. Just one more operation, that of mulching, is necessary to insure our patch safely through to bearing season. One of the best mulching materials is clean oat or wheat straw, and should be applied evenly over the entire surface of the patch. This should be applied after the first hard freeze; when the soil is frozen two or three inches deep will do. This mulch should be removed at blooming season.

—Journal of Agriculture.

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## STRAWBERRY CULTURE—PROTECTION.

By O. W. Blacknell, Kittrell, N. C.

That in cold climates where the thermometer falls much below zero the strawberry plant needs winter protection is a well-established fact. There it is the custom to apply mulching over the plants as soon as the ground freezes hard enough to drive on without much breaking of the



crust. The date of application will depend on the latitude and the earliness or lateness with which winter sets in.

An almost endless variety of material can be used for this purpose. Pine leaves, wheat, oats, or rye straw, forest leaves, marsh grass and stalks of many kinds. What is desired is to cover the plants just deep enough to greatly lessen, but not entirely prevent freezing. The harm that freezing or rather alternate freezing and thawing does is chiefly mechanical—the heaving of the soil and the attendant breaking of the roots as the plant is raised upward with the soil. This can be attained by using more or less of the mulching material in proportion as its nature is to lie close or open and as the climate is more or less severe. Thus, a much thicker mulch of corn stalks than of straw will be required to attain the desired results.

The objection to a long light material like the straw of small grain is that it is liable to be blown off. Forest leaves are also objectionable for this reason. This difficulty is partially obviated in the case of straw by cutting up the material short. Probably the most effective prevention of this trouble with both grain and forest leaves is to anchor them down with earth or small stones judiciously placed at intervals.

How far south it pays to use winter mulch is a mooted point. It is doubtful whether as a rule it pays south of the Mason and Dixon line, except in the mountains. Some winters it pays in North Carolina. Often it does not. The objection to winter mulch at the south is that it harbors crickets and other insects harmful to the strawberry plant.

But for one purpose winter mulch is beneficial wherever the ground freezes as deep as two inches. That is to protect plants set in winter on wet, stiff soil. This soil is much given to heaving, and plants set on it in the depth of winter are apt to be lifted out of the ground by the alternate freezing and thawing. A handful of pine leaves thrown over each plant prevents harm. On nearly all soil, or in fact on any except wet, stiff fields or parts of fields this protection of newly set plants is not necessary south of the Mason and Dixon line. We do most of our planting in late November, December, January and February, and get a perfect stand without this protection except on a few wet spots. But at the North it renders practicable planting at a much later time in the

fall than would be advisable without it.

The use of straw of various kinds to protect blooms from late spring frosts has now become pretty general. The straw is strewn along the middles in advance and on the plants when frost threatens, and off when the danger passes.

The use of mulch to keep the berries clean is imperative. We apply it about blooming time.

For several years, beginning in 1887, I used cloth largely to protect strawberry blooms from frost. The kind used was a thin muslin, sold at the South for the use on tobacco plant beds, where it is found equally valuable as a protection from frost and from a destructive species of fly. I found that the tarred or chemically treated cloth was much the best.

My object in using this was to protect the strawberry blooms from frost and also to promote earliness in the ripening of the fruit. The cloth was put on about a month before the blooming period and not removed till the berries were ready to be picked. Small, low stakes provided with wire hooks were driven in the ground at short intervals. These held the cloth securely against the hardest wind. Being low, they did not hold the cloth high enough from the ground to be torn from its fastenings by snow.

The effect of this mode of protection was fully up to my expectation, both as a safeguard against frosts and as a promoter of earlier ripening of the berries. Berries under the cloth ripen about one week earlier than those outside. On April 16, 1890, the ground froze half an inch deep and frost killed every exposed bloom. Not one per cent of those under the cloth was lost. As a consequence we netted nearly \$1,900 on about six acres.

The largest yield that I ever made, 11,000 quarts on one acre and a quarter, was under cloth.

Moreover, there was another very unexpected and surprising result from this mode of protection. The berries grew much larger, giving a corresponding increase in the yield per acre.—*American Fruit and Vegetable Journal*.

**TREATMENT OF STRAWBERRY BEDS AFTER FRUITING.**

By B. F. Smith, Lawrence, Kan.

Realizing the importance of the proper cultivation of strawberry plantations after fruiting, the Southwest gives the following special correspondence received from successful growers in Missouri and Kansas: Old berry patches should be first chopped out, leaving as wide space between the rows as possible. Cut half the old row out with the space between. In so doing there is room enough to plow two or three small one-horse plow furrows between the rows. Follow immediately with a small-tooth cultivator till soil is thoroughly pulverized. Then proceed as though the berry patch were a new one, weeding out rows and working the cultivator after every hard rain. Now, if patches have borne two crops, plow them up. If there are leaf rollers or other insects injuring plants, mow weeds and leaves off as closely as possible, and as soon as they are dry rake and burn. It is the old berry patches that breed all the enemies of destruction that we have to contend with in berry culture. To keep these in check all berry fields, before plowing up, should be burned all over for their destruction.—*Prairie Farmer.*

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**WHY STRAWBERRIES SOMETIMES FAIL.**

R. M. Kellogg, Michigan.

While we have made rapid advancement in cultural methods and have gained a better conception of soil requirements and plant foods, yet many serious failures and great losses occur for the want of a proper knowledge of plant life and the laws which govern the development of fruit. I believe a careful examination of the berry fields throughout the country will show they are not producing on an average one-half the fruit they should, either in quantity or quality, and that this failure is not so much due to defects in cultural methods as to the physical condition of the plants.

Few growers comprehend the fact that when trees and plants pro-

duce fruit they are breeding, or in other words laying their eggs. The fruit flesh grows only as a substance for the seeds to develop in. If there be no seeds there will be no fruit. The growth of the pulp or flesh is very largely governed by the potency of the pollen as well as condition of the pistils. The general failure of new seedlings comes from the fact that in producing their seeds they do not have the habit of making enough fruit flesh and do not impart to it the desired flavor, color and texture, and so we discard it. If we grow 20,000 seedlings we may scarcely find one which will meet our requirements in these respects. It is for this reason we hear so much about chance seedlings found here and there by accident. Very few of our best varieties are the result of seed plantings and many are no doubt only bud variations.

Pollen production is the most exhausting and devitalizing process the plant is ever called upon to undergo, and accounts for the failure of the many introductions of new varieties. They produce wonderful berries, many of them at first, receive the gold medals and unstinted praise from government experiment stations and growers alike, shining like a meteor for a season, but soon become pollen exhausted and consequently unfruitful, and are dropped from the catalogues as unprofitable for further cultivation. Pollen exhaustion is, we believe the prime factor of unfruitfulness in all our orchards, berry fields and vineyards, and that this unfruitfulness is heredity, passing to new creations through seeds, buds and runners.

Much light may be thrown on this subject if we examine the physiological structure of plants and trees. Each one is not only an individual as a whole, but is an entire colony of potential lives. The protoplasm, which Prof. Gray describes as "that stuff in which the principle of life resides," is found in every node and internode throughout the body of the tree or plant, and hence we may divide the plant as by making cuttings, budding, grafting, runners, etc. We can now readily see how it is that when we take a runner from a plant weak in seed bearing, that it should more largely partake of the parental weakness than one grown from seeds. It is true that if a weak plant be restricted and placed under high tillage and careful selection, it can be made to improve rapidly and in a few generations overcome this

weakness, but this would involve serious loss. The cost of growing vigorous plants is so small, the weak ones should be discarded at once. We all know if any of the bush fruits are allowed to produce an excessive crop of berries one year, there will be light yields following for several seasons. Excessive bloom of an apple orchard is always followed by light crops of poor fruit.

Strawberries will lose the habit of setting fruit or forming fruit buds by not letting them bear fruit through many generations. Any faculty, whether found in plant or animal which is never exercised through many generations will be lost and strength can only be increased by exercising these functions, hence it is that taking strawberries every year from those set out the previous spring is bad.—Orange Judd Farmer.

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## PRACTICAL RASPBERRY CULTURE.

C. C. Beals, Indiana.

Raspberries require a moist, clay soil, not too thin. The land must be of such character that it will not dry out readily, for if this occurs at any time while the berries are on the vines, they will dry up. The subsoil should be clay and well drained, for the plants can not live if the roots are in the water. This matter of a prepared soil is important and is too often neglected by the farmer who has only a small patch of fruit. The rich black soils of Indiana and the middle west are sometimes unsatisfactory because they dry out too readily, but of course if the land is given proper treatment, that is, cultivated shallow and frequently, so as to conserve moisture, this will not occur.

There are three types of raspberries—red, black and purple, differing considerably in their requirements. The red berry succeeds through a wider range of soil and climate than either the black or the purple. They are commonly grown from one-year-old suckers or root cuttings and are planted in rows seven feet apart, with plants two and a half feet apart in the row. Fully one-half of the old suckers should be destroyed

each year. Plant either in the fall or spring, the best time being in early spring.

In pruning, simply head back the canes of the previous year's growth and in early spring remove all the dead wood. There are many theories as to the best time of pruning raspberries. For instance, if the cutting back is done in the autumn the six or eight inches of cane that remains is likely to be killed in the winter. This dead wood of course gives the field a bad appearance the next spring, consequently in my opinion, it is best to wait until freezing weather is past and the buds have just started. Growth will then continue right along. I do not believe as some do that the canes should be cut back within eighteen inches of the ground. I leave them from three to three and a half feet high. The side limbs can be cut off or not, this being determined by the desired width of the row. There must be room enough between the rows to permit of cultivation without damage to the canes. Canes that have fruited should be removed as soon as the crop is taken off in summer and burned, so as to kill all insects and fungi. Good varieties of red raspberries are the Hansell, Marlboro, Cuthbert and Turner.

The blackcap or black raspberries are less popular than the red for use on the table when fresh, but are grown considerably now for canning and evaporating. The plants are obtained from the root tips and should be out the same as red, except that the plants may be set closer in the rows. They require similar treatment. The Ohio, Conrath, Gregg, Doolittle and Palmer are good kinds. Purple raspberries are not very popular in the market. The Shaffer is probably the best kind and is treated the same as the red and black.—Orange Judd Farmer.

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#### REMOVE THE OLD CANES.

Some advocate the leaving of the old raspberry cane after fruiting—claiming that they are not only beneficial in protecting the young bushes during the winter, etc., but that their mission is not really filled during the year, holding that the next year's crop is impaired if bushes

are removed before spring. Now the former claim may be all right in some locations where the winters are extreme, and where a deep snow is beneficial, as the cane will hold the snow and aid in keeping the young growth from being broken down, but the latter we can not see.

When a bush has borne its fruit and is dying off, as all raspberry bushes do, then we advise making a business of cutting out all the old canes and burning them. Do not put them in a pile or throw into the wood lot. Why this care? To explain: Our raspberry fields were a pleasant sight to see in the early summer but before their fruit was ready to pick the bushes commenced to show signs of sickness, the fruit ceased to grow and in some instances dried up. In examining the old wood we found out the cause, four-fifths of the canes were infested with the borer, from one to ten being found in each cane; these pests were in different stages of development, many ready to come out and start business on the young wood for another season, while some resemble ants' eggs. And this in the heart of the cane, of course, had taken the vitality out of the bush; it is needless to say that every old bush was speedily cut out and burned. Billions of these borers must have perished.

Then again, the dread disease of the raspberry, anthracnose, spreads badly, but if the old bushes are burned every year we expect to be able to care for the young ones. Spraying is beneficial, but we will keep in mind after this that old proverb, "An ounce of prevention is worth a pound of cure."—*Green's Fruit Grower*.

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## DEWBERRIES AND THEIR CULTIVATION.

By F. H. Speakman, Neosho, Mo.

Having promised the editor of the *Western Fruit-Grower* that I would write an article on dewberry culture, I will attempt to relate some of our experience with the *Lucretia* at Neosho, and to make some of the characteristics of the plant and its fruit. Our experience with the

Lucretia began in the spring of 1896, when we set out 1,000 plants. Of this number probably 700 survived and made a fair growth during the season. Good cultivation was given them throughout the spring and summer, and early the following spring plants were cut back to within eighteen to twenty-four inches of the root, according to the strength of the individual plant. The ground having been dug up in order to save the tips that were rooted, it was necessary to mulch to keep the fruit from becoming soiled by rain, so a small quantity of straw was worked under the vines for that purpose.

Nothing more was done except to cut down rank weeds that appeared until after the crop of fruit was removed, which consisted of seventy crates of fine berries that we picked and several more that were left, owing to injury from direct exposure to the sun. One year after the first setting we put out about four acres more, planting five feet apart each way. This allows thorough horse cultivation to be given both ways until plants become so large it is necessary to train them in a row one way. After this time it is usually best to give them two or more workings one way. Owing to the great drouth of the season of 1897 plants did not make the usual growth, and the crop from this planting was small—probably seventy-five crates to the acre.

In the spring of 1898 we set thirty acres, planting the same as before—five feet apart each way, 1,742 plants to the acre. The cultivation given was the same as that given in 1897, and a good growth obtained. Owing, however, to the extreme cold of the winter of 1898 and 1899 we did not cut the plants back, as much injury was done to them and many long vines were killed outright. Notwithstanding this, prospects for a crop were good until blooming season, which was very unfavorable, owing to long continued rains, which seemed to blight the fruit, causing it to make "buttons." Particularly was this noticeable on the strongest land, which usually produces best fruit. It is my opinion that much more injury was done by the winter's cold than was apparent, and that the weakened condition of the plants accounts largely for their failure to form perfect fruit.

The crop from this planting was very small, but good prices obtained from the fruit prevented any great loss.



I have spoken thus far only of the cultivation for the year of planting, which one might suppose to be the most important. However, we soon discovered that the dewberry had an enemy in the form of a small borer which makes its home in the strongest canes, cutting them to such an extent that many die during the fall and winter following the summer during which they are attacked by the insect. The only apparent prevention of injury from this insect seems to be in keeping the canes small by causing them to start late in the spring. The best prospect that we have had at any time for a large crop of fruit is a piece that was plowed up last spring and planted with peas. These were removed the latter part of May, and as the dewberries were coming up nicely we concluded to try an experiment and allow them to grow. With but little cultivation after that given to the peas they made a fine late growth and, to all appearances are in good condition to make a crop. Of course with this treatment a crop of berries can be obtained only every other year, but you have the satisfaction of knowing that your ground is getting richer each year and a paying crop of some early-maturing vegetables or cereal may be grown on the off years. Just what results can be obtained from the dewberry by this treatment remains, as far as I am aware, to be proved. Of course where insects affecting the canes are not present, regular crops can be expected. However, even in such sections, it is my opinion that it will be profitable to occasionally burn off and plow the vines under in the manner I have mentioned. This will destroy insects and the spores of the leaf blight which affect the dewberry and blackberry nearly everywhere in our country.

In conclusion will say that while many fruit-growers condemn the Lucretia dewberry, I am very much inclined to think it has come to stay in our gardens and fields, for some time at least, and I fully expect to derive a good deal of satisfaction from its cultivation and returns during the next few years.

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By S. S. Garman, Darlington, Mo.

I see that J. W. Greene of Chillicothe, Mo., says it is a puzzle to

him to know how anyone can raise dewberries successfully; says he has a hundred hills and never got a quart of berries, all told, good or bad. We have fifty hills of Lucretia dewberries and in the summer of 1898 we gathered about 100 quarts of berries. We sold 76 quarts, canned a lot, and used many in other ways. They are luscious; a majority of them would measure an inch and a quarter in length and an inch in diameter. But last winter froze them so badly that we got but few berries last summer. We would pick them every day; on the 8th of July we picked 26 quarts.

I had some before I bought these that, as you say, did not yield a quart of fruit. That was a swindle; they were not Lucretia. If we buy of agents coming around we will occasionally get swindled, especially if he is a stranger. I rather think Mr. Green's plants are not Lucretia. Dewberries do not require rich land; they do best on clay soil. The soil where we have them is too rich, the plants grow too much vine. The vines have now got so thick I don't know how to manage them. How would it do to mow the vines off after fruiting this season? I fear I would get no fruit next season, for the vines grow one season and bear the next.—*Western Fruit Grower.*

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## CURRENTS FOR MARKET AND THE HOME GARDEN.

We have for many years grown currants in a large way both for fruit and plants, and have on hand at present time something like seventy-five thousand plants. About one-third this number are fruiting bushes for the coming season. The reader will easily realize why we should be interested in this branch of horticulture, and this interest prompts us to request *American Gardening* to give publicity to these notes.

Our time has been well occupied for many days past pruning the bushes that will bear fruit this year, and we are pleased to be able to say that the plants never looked more promising. They seem to be in splendid condition and a large crop of fruit is almost a certainty.

We are at this writing preparing to spray every tree, plant, bush

and vine on our grounds, and the currants bushes will certainly be attended to with extra care. They will be sprayed again just as the buds are breaking through.

Currants are about the cheapest and easiest crop of fruit to produce, requiring very little time and labor as compared with many others. For fillers, or what might be termed a catch crop, they are indispensable, when grown between plum, pear, peach, cherry and quince trees. They can be grown in an orchard of any of these fruits without retarding or injuring the trees. When currants are fruited in this way it is merely a question of more manure or fertilizer. Every intelligent fruit grower will understand this at once. Under this system of intensive gardening you have a nice income from your currants, while your fruit trees are developing and getting ready for fruiting.

It depends entirely upon yourself as to how long these bushes will bear large, marketable fruit.

No matter how great a sacrifice it may seem, you should remove two-thirds of the new wood each season. Failing to do this, you will soon have a lot of overgrown bushes on your hands, and the fruit will soon dwindle in size and be imperfect in many ways. On the other hand, if you prune judiciously, spray as often as is necessary, manure well and cultivate thoroughly you can keep your plantation of currants in perfect order for at least ten years, and one year with another, you will be well recompensed for your investment and labor.

It may not be out of place for me to say that from young bushes that were planted two years ago (and in a young pear orchard) we picked last summer four and five quarts of fruit, and we obtained the result from many hundreds of bushes. We will not go at this time into any lengthy details in relation to planting distances and cultivating, but pass on to briefly describe the popular varieties, selecting those best for market, and those best for home use.—*American Gardening.*

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## GROW GRAPES ON EVERY FARM.

By A. H. Gibson, Kansas.

Grapes are easily grown and deserve more attention than is now

given them. Nothing will so redeem an unsightly place in a back yard or improve a neglected corner of a garden than a small number of well-trained grapevines. If only a few can be grown, it is best to choose some of the hardy sorts that combine the excellent quality of rapid growth with that of delicious eatableness. If more ground can be spared, then it is a good idea to have several varieties. Concord, Worden, Delaware, Brighton and Niagara are all good and grow readily.

For a grape patch of larger size, the following directions are recommended. For most varieties, plant 10 feet apart each way with the rows running north and south. Smaller sorts may be nearer, while vigorous plants upon strong fertile soil may be put 12 feet apart, and even more. For the first two seasons they may be trained to stakes, one shoot only being allowed to start. After this, use a trellis of two wires, the lower one about four feet from the ground, the top one two feet higher. This will allow the air free circulation through the branches and lessen the danger from mildew. Spray the vines before the buds start in the spring with copper sulphate solution or bordeaux mixture. The latter application may be repeated once in two weeks as long as very moist weather prevails.

When the leaves have fallen, pruning may begin. Cut out all the dead or broken branches and remove the weaker shoots. Some recommend cutting back the strong canes to three buds, leaving from 20 to 40 spurs. But this pruning should be conducted with careful judgment. Many of our American varieties will not endure with impunity the rigid pruning which German and French grape raisers give their vines. Our vines are planted farther apart, and in consequence we must leave more wood. As the vines grow older, alternate ones may be removed in order to let each vine hold twice the trellis space at first given it. Vines treated in this manner are much more likely to escape mildew. Some root pruning is likewise advisable by cultivating more deeply and keeping the roots of the grapes where they will be the least affected by changes of temperature.—Orange Judd Farmer.

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#### THE CONCORD GRAPE MEMORIAL.

A meeting unique in character and peculiarly interesting to all

horticulturists was held at Concord, Mass., April 16. It was in honor of Ephriam W. Bull, originator of the Concord grape, and was held in the cottage where he lived, which Mrs. Daniel Lothrop, a neighbor and friend, has remodeled and furnished as a memorial of the man and his work, having purchased the little twelve acre estate for that purpose. It may be mentioned that the place once belonged to John Hbar, ancestor of the present senator of that name, also a resident of Concord.

The central point of interest was of course the original Concord grapevine, now inclosed in a high green lattice, surmounted by memorial urns. We should have been glad of more details of its appearance and condition than the Boston Herald has given us. On an oaken tablet are these words from Mr. Bull's account of the origin of the Concord:

"I looked about to see what I could find among our wildings to begin with. The next thing to do was to find the best and earliest grape for seed, and this I found in an accidental seedling at the foot of the hill aforesaid. The crop was abundant and ripe in August, and of very good quality for a wild grape. I sowed the seed in the autumn of 1843. Among them the Concord was the only one worth saving."

Ephriam Wales Bull.

The house has been carefully remodeled, decorated and furnished, preserving the original lines and character. All the floors are hardwood. An old colonial staircase winds up from the library, formerly Mr. Bull's bedroom, and a Dutch door opposite opens on a wide piazza. The drawing-room is as large as the original house, lighted by four windows, and has a large old-fashioned fireplace, such as the early settlers used to enjoy. Over this is a set of photographs of Mr. Bull and his garden at various periods. Attached is the following quotation:

"I confess I did not expect to arrive at so great a success so soon, but when I had the good fortune to find the Concord among the first crop of seedlings, the thought dawned upon me that in the perhaps far-off future higher success awaited the cultivator, who had the patience to wait, I had almost said the courage to venture, for I was sensible that any attempt to improve the wild grape would be considered an imputation upon the judgment and sagacity of the operator. Fully aware of this I kept my own counsel, and if I had not succeeded, nobody would

have known that I had ever ventured."

In the dining-room over the mantel is another quotation from Mr. Bull's statement:

"Final summing up of 37 year's work from over 22,000 seedlings, 21 grapes, which in the light of to-day I consider valuable. I had at one time 125 vines which I thought worth saving, but grown more critical with every new success, I have discarded most of them."

Mr. Bull learned the goldbeaters' trade in youth, and set up in business in Boston. But ill health drove him to the country, and going to Concord, he settled next to a brother who occupied the now famous "Wayside," about 1836. The pine belt and other healthful surroundings proved of great benefit. In the autumn of 1843, Mr. Bull sowed the seed that produced the Concord grape, but it was not put on the market till 1855. In that year he received a silver trophy from the Massachusetts Horticultural Society, and in 1874 a gold medal. The State Board of Agriculture gave him a silver piece in 1872 for collection of seedlings. He served on this board 12 years, and in the Legislature two years. Among his life-long friends was Prof. Agassiz, before whose class he delivered three lectures on grapes and grape-growing in 1865. Hawthorne, while living at the Wayside, was his intimate friend and spent many hours in his house and garden, for Mr. Bull was a philosopher and student as well as a grower of grapes. Many of his neighbors delighted in his kindly manners, keen, alert mind, and bright, cheerful conversation. With advancing age, Mr. Bull was less able to manage things profitably, and his good friend Judge Rockwood Hoar bought the place, Mr. Bull continuing to make it his home. In 1893, Mrs. Lothrop bought the place. Two years later, on March 26, 1895, Mr. Bull passed away.—Country Gentleman.

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#### GRAPES—ORDER OF RIPENING.

In Bulletin No. 46, from the Missouri Experiment Station, Prof. J. C. Whitten gives a list of grapes fruited in 1898, arranged in the order of ripening. The Professor says:

In noting the comparative date of ripening of the different varieties of grapes it should be borne in mind that they differ in this respect in different seasons. For example, in dry, hot seasons Delaware sometimes ripens very early, while in wet cool seasons it is much later. Again, it is difficult to determine just when some varieties may be said to be fully ripe. Janesville and Mary Ann are among the first to begin to color, and consequently are ripe in appearance before they are in quality. A very sweet grape, like Goethe, is very agreeable to the taste long before it is fully ripe, while a grape of poor quality, like Venango, does not appear to be ripe until after its true ripening period is past. The following list will, however, give a very approximate idea of the comparative date of ripening of the various sorts:

August 7, Early Ohio.

August 9, Champion.

August 10, Green Mountain, Moyer, Hartford.

August 11, Jewel.

August 12, Ives, Janesville, New Haven.

August 13, Aminia, Brighton, Early Victor, Moore's Early, Massasoit.

August 14, Northern Muscadine, Whitehall.

August 15, Black Eagle, Mary Ann, Norfolk.

August 16, Perkins.

August 17, Ideal.

August 18, Telegraph.

August 19, Martha, North Carolina.

August 20, Eumelan, Faith, Potter, Cottage, Wells.

August 21, Creveling, Barry, Diamond.

August 22, Amber Queen, Concord, Wyoming Red, Rommel.

August 23, Dracut Amber, Hayes.

August 24, August Giant, Herbert, Worden.

August 25, Eaton, Mason, Wilding.

August 26, Beauty, Black Hawk, Ulster.

August 27, Jaeger.

August 30, Montefiore, Herbermont, Clinton.

September 1, Cambridge, Gold Coin, Isabella, Lady, Missouri Ries-

ling, Venango, Woodruff Red.

September 2, Carman.

September 3, America, Challenge, Lindley.

September 4, Duchess, Elvira, Iona, Marion, Salem.

September 5, Norton, Israella, Taylor Bullit, Vergennes, Rentz, Rochester, Requa, Wilder, Black Defiance, Cynthiana.

September 6, Catawba, Peter Wylie, Lady Washington, Black Pearl, Jefferson.

September 7, Agawam, Greins Golden, Transparent.

September 8, Goethe, Diana Ozark, Poughkeepsie Red, Uhland.

September 9, Delaware, Conqueror, Elvicand.

September 10, Brilliant, Berckmans, Othello, Pearl.

September 11, Bacchus, Pocklington, Roger's No. 2.

September 12, Amber.

September 15, Columbian Imperial, Noah, Iron Clad, Neosho.

September 17, Etta, Hermann.

September 20, Cunningham.

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## A BUNCH OF GRAPES.

E. P. Powell.

The Jefferson grape, where it can be ripened, is at or near the head of all grapes for outdoor culture. It is a red fruit, produced in great crops and large bunches. The flavor is unsurpassed. But while the vine is hardy, the season required for ripening the fruit is too long to allow the Jefferson to perfect itself in a climate north of New York City. It ripens with me about October 20, but the chances are that a frost before that will have nipped the foliage and weakened the power of the grape to digest its food, leaving the grapes never quite perfect for the table and unfit for market. But a good bunch will never be forgotten after being once eaten. The vine is a good grower, and the power for self-pollenization is nearly perfect. The Iona is a rival of the Jefferson for first place in all lists of outdoor grapes. But, unlike



that, the vine is tender and must be protected for winter. When Dr. Grant sent the Iona out from his island home in the Hudson river he gave it the name of his island, and very wisely. It is an honor to scientific horticulture. The fruit is light red, hanging in large bunches. A peculiarity is that the stem is very brittle. It must be carefully handled, but when stored it keeps extraordinarily well. If carefully gathered, even before it is entirely colored, it has the peculiarity of going on to ripen in the house. So you may class Iona among your best home grapes. Let it hang on the vine as late as possible, and then spread it in open baskets or drawers, and you will be surprised at its ability to resist decay and shriveling. I eat them as late as December. There are just two drawbacks to the Brighton, which keep it from being positively the best of all our vineyard grapes. First, it loses quality soon after ripening, so that it is not excellent for marketing at a distance; secondly, the flower is a total failure in self-pollenization. In this regard it is one of the poorest of our grapes. You must plant the Brighton with neighbors that will give to it sufficient pollen. But when this is furnished the fruit is abundant, almost as much so as that of the Niagara. The bunches are a delight to the eye, and the quality is close after that of Jefferson and Iona. It is a seedling of the last named. It has a habit of ripening all along for a month, making it a capital family grape. In fact, it should be one of any five selected for garden or house. It is most delicious when first cut from the vine, but after being picked for a week it gradually loses its flavor. I prize it as among the very best in my vineyard. I do not know why the August Giant, among grapes has been so much overlooked, unless it be from the trickery used in naming it. It is not an August grape at all, and hardly a September grape. It ripens about the last of September to October 10, but it has quality not to be passed by. The flavor is intensely rich, and if thoroughly ripened it surpasses in sugar all other grapes of the Concord class. But the more marked peculiarity of this grape is the vigor of the vine and its rapidity of growth. There is nothing among our cultivated grapes to compare with it. As it is a self-pollenizer, it can be planted alone, to run over barns, arbors, verandas and rockeries. I should prefer it for any place where I wished for

large and abundant foliage. A cane will easily grow forty feet in a season. It is also a most profuse bearer of large bunches of black fruit. The grape is about the size of the Worden, and the bunch a little resembles the Isabella. If not well trimmed and opened to the sun, there is a tendency to mildew. This is not marked on large and sunny trellises. The skin is strong, but not thick, and the grape keeps remarkably well. I notice that my children always go for the August Giant, which among twenty varieties makes a good test. The grape after being eaten leaves a rich flavor in the mouth—unlike the habit of many grapes, which we have to swallow without crushing for fear of tartness. I recommend the August Giant where the season is long enough to perfect it. A grape likely to drop out of sight is Duchess; yet it is one of the most delicious grapes in existence. It is crisp, juicy, free of tartness and possessed of a fine aroma. It is another grape that the children claim a right to call their own. The vine is not generally hardy, and the berries ripen unevenly, so that it is a difficult grape to market. But for a table grape what can possibly surpass it? The vines are covered with long, large bunches, that make a very wall of fruit. The color is transparent white. Just when to tell that the Duchess is surely ripe is not easy; but when it has a touch of brown on the cheek, and you get it just right, it is food fit for the gods. Unfortunately, the Duchess after it is ripe can not be left very late on the vines without cracking. Pick it carefully and lay it away and it will keep nobly. With other good qualities the skin is very thin but strong, and the seeds are few and small. We have come to a time when it must be a special aim to eliminate seeds from our grapes, especially the large seeds that characterize the Rogers hybrids. The Duchess is also a self-pollenizer, which is a matter of the highest importance for a grape that we wish to grow about the house or on arbors. Plant a couple of Duchess in your garden, trim and cover every fall for winter, and you will never regret it. The Bolden Pocklington is another grape that has also begun to drop out of general cultivation. And it will hardly get a hold in our vineyards again north of New York city, or possibly the line of the Erie railroad. While it is positively the most hardy of all our good grapes, it needs, like Jefferson, a longer season than we can give it in which to

ripen, but it has qualities which are invaluable to lovers of grapes. It bears enormous crops of rich golden white fruit. When quite ripe the Pocklington may be kept until January in a cool room. It is not equal to Iona or Jefferson, or Duchess in quality; but is, when perfectly ripened, a grape of really excellent flavor. The berry and bunch are both large, and they are superb to look at. I do not know one white grape, late in the season, that compares with it; and among all late grapes it has no rival but Diana, Catawba and Alice. The winter of 1895, which destroyed every uncovered grapevine of over fifty sorts, left the Pocklington uninjured. I recommend a vine of Pocklington to every home to be planted in a sunny location and to be kept well trimmed and open to the sun and air. I should like space to add a note for a few other neglected grapes, especially for Walter. This grape very closely resembles Delaware, but with a bunch as compact as Diana. It is a remarkably good pollenizer. A vine loaded with fruit presents about as fine an appearance as anything in the vineyard. Precisely why it is not more often planted I do not understand. It is certainly far worthier of attention than some of the more highly lauded varieties for which our money is expended. But I reserve for future notes a few other really good sorts that should be preserved.—New York Tribune.

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## HOW TO GROW CHOICE NURSERY TREES.

G. T. Tippin, Nichols, Mo.

(Read at the 43d Annual Meeting.)

In complying with request to write a paper on "How to Grow Choice Nursery Trees," we can only give our experience in South Missouri connected with observations covering a considerable portion of the fruit producing sections of the country. The suggesting of the subject implies the importance of its discussion and fixes the impression at once, that there exists difficulties in the way of successful orchard growing, in some parts of the country at least. The difficulties are legion. The enemies incomprehensible. There is no vocation given to

man that can develop as many evils and pests as the field of horticulture, made up of climatic and soil calamities, microbes and Fungi, ranging in size from those requiring to be magnified several thousand times in order to be seen, up to the size of a man. The one of size and shape of man doubtless the worst of the whole lot, and if, in the discussion of the subject of how best to grow choice nursery trees, ideas may be advanced that will lead to the production of a more healthy and perfect tree carrying with it the assurance of greater success and happiness to the planter, it is doubtful if the majority of the great army of fruit growers would ever enjoy the benefit. You no doubt would ask, why? Let me answer. The great why, is the why, that has kept many good things and good ideas confined to small fields of usefulness, while visionary theories and fraudulent claims span the globe. The one contributed out of the spirit of philanthropy, that the horticulturist may have something better, and that too, without being shrouded in mystery. The other out of a spirit of self interest alone, under the claims of superior merit protected by copyright, exclusive right, patent right, together with the assumed right (which as a rule is permissible by the unwary planter) to get something for a fraud, the perpetrator thereof knowing, that if he gets the money he wins, as society will say, he is a financial success, so the end justifies the means. The moving power explains the rapid travel of the latter. We must now take up the subject in hand, even though there is great danger of some fellow patenting the process of how to grow a choice nursery tree, before the coming report of this meeting is published and will have two-year-old trees to offer for spring trade to the people of Farmington and southeast Missouri, under private trade mark. As apple growing is most extensive in South Missouri we give the propagation of this tree the greatest consideration. As in the breeding of animals great care should be taken in the selection of stock from which trees are to be made. Scions should be cut from healthy, thrifty growing trees, selected from orchards and trees producing the best type of each variety. Good healthy scions are as necessary in the growing of good trees as good healthy stock, or roots upon which they are to be worked. We use our native well grown stock and think them as good as can be had. In our

opinion much of the success of a choice tree depends upon the workmanship in grafting, as some of the more potent evils with which the orchardist are now contending may have their origin here, in part at least, and to which we will refer later on. In forming the union or splice in grafting the same care should be taken as in setting or splicing a broken bone, comparatively speaking as far as observing the natural laws of vegetable growth is concerned we do not like the ordinary wholesale way of commercial grafting. One cutting and sloping the roots. one the scions, each throwing in piles. The third man picking up promiscuously and sticking together in haphazard way. One man should make a complete graft, insuring a more perfect splice and less danger of foreign substance coming in contact with the fresh cuts before being put together. The laps should not extend beyond the slope on either side. In tying care should be taken in not allowing the thread to pass between the laps. While we are not positive that root knot (which is becoming somewhat alarming in some localities) has its origin in the making and planting of the graft, but believe it is largely due to defects at this period of the tree's existence. We examined one lot of trees in Arkansas that were two year old and grown from grafts that in tying the thread had been jerked between the laps to break it. Seventy-five per cent of these trees had root knot. We also prefer the use of short piece of root and long scion which give us best results. We do not notice that root defects have increased with us, while many say that they have sustained quite an increase in loss the past four or five years. This may also be attributable in part to the use of long pieces of roots and short scion which when set out leaves the tender calloused wound too near the surface of the soil, susceptible of variations in moisture and temperature that it would not be if lower down, the effect being the same as in exposing a flesh wound causing unhealthy conditions to arise. With grafts well made from well selected stock planted deep in well prepared soil, we are ready to grow a choice nursery tree which is completed by thorough cultivation which should be applied as often as necessary to keep down all vegetation and the soil in perfect tillage. Same applies in growing all other nursery trees, except those kinds which are budded instead of grafted. Peach, plum, cherry and

pear being generally budded. Choice trees of Kieffer Garber and kindred pear can be grown from grafts, while varieties with brittle tender wood like Bartlett, Duchess and many others are more successfully budded.

Mr. President: We do not feel that it is necessary to extend our paper further upon this subject in order to bring out a general discussion and will close by calling the attention of the planter to the fact, that his being able to secure choice grown trees from the nursery does not make them immune to the many difficulties and obstacles that may arise. The stock man may supply himself with thoroughbred horses, cattle, sheep or hogs, all well grown, but behold the humiliation of his pride when he sees the effects of uncongenial surroundings, dismal swamps, barren hills, nonfertile fields, and unprotected habitation. So it is with the choice grown nursery tree which carries with it the advantage of being well grown and well bred, if planted in uncongenial surroundings as to soil, location, and climate, will be a failure and you will be disappointed. Select choice grown trees, plant them under favorable conditions, give them proper care and culture and you will succeed.

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## ONE MAN'S EXPERIENCE IN THE CULTURE OF PEARS.

By S. H. Van Trump, Lawson, Mo.

I have promised to give the readers of your excellent journal an account of my experience in the culture of the pear. In doing so I shall attempt to be perfectly loyal to the truth. I have no theories to formulate or defend, no nursery interests to build up, nor real estate business to boom.

We have always believed that so far as this section of the Mississippi Valley is concerned, our choicest fruit soils are to be found making up the gentle slopes which unite the rich black upland prairies with the still darker and heavier alluvial formations bordering the streams. These slopes possess the best natural drainage of any soils we have. Being formed from drift transported from distant northern regions, the feldspathic rocks they originally contained have rendered these soils very rich in the mineral elements of plant nutrition, and especially of

the essential element, potassium. Containing a liberal admixture of small stones thoroughly distributed through the surface, they are light in color, warm, friable, and respond readily to natural or commercial fertilizers. These qualities combined in a fruit soil produce a growth of wood of the most hardy and healthy character, and a yield of fruit of the highest quality and finest appearance, which, moreover, is always earlier in ripening than fruit grown on cold and heavy soils. The character of soils commonly termed white oak slopes have, I think, almost universally proved the best for pears.

Our experience in pear culture dates from the spring of 1893, when we made our first small planting. We did not have at our disposal an ideal pear soil, so made use of the best we had. This soil is upland prairie of the "loess" formation. It lies rather flat, contains but few stones, and in some spots is inclined to be wet. The planting referred to consisted of just one-half acre. We planted in squares of seventeen feet, and the number of trees was seventy-two. There are many planters who regard this too close for standard trees, but I think it affords plenty of room, air, light and fertility. At least, I would not plant farther apart when all the uncertainties of a pear orchard are considered. We bought our trees, like all readers of the *Western Fruit Grower* should do, of a reliable nurseryman. These trees were propagated on true pear stock, and, presumably, not on Le Conte stock. They were planted according to the best methods of deep setting, proper pruning, etc., and every tree lived and grew nicely. The varieties planted were Bartlett 12, Idaho 12, and Keiffer 48 trees.

In the spring of 1894 we planted on an adjoining one-half acre 60 Keiffer standard trees and 40 Duchess, dwarf. The distance of planting here was 17 feet for the standard trees and 10 feet for the dwarf. In the spring of 1895 we planted about 20 trees of Keiffer and Garber, mixed lot. In the spring of 1896 we planted 30 standard Keiffer trees on ground adjoining the former planting. In the spring of 1897 we planted on adjoining ground one acre of standard Keiffer trees, numbering 144.

Now, the culture of these several plantings was the same. They were given clean, surface culture for from two to three years, and then

seeded to clover.

Of course, from the start we realized that our greatest enemy would be fire blight, and we were constantly vigilant, using every effort to keep it out, and after it once appeared redoubling our efforts to hold it in check.

It may be proper to remark at this point that our method of pruning the pear is to let it alone, at least to the extent of doing no severe cutting. The pear naturally forms almost a perfect top, and cutting the branches, except during the first two or three years of growth, may often endanger the life of the tree. About the only essential pruning is to keep the shoots removed from the trunk and larger branches.

Our record shows that the first blight made its appearance among the Idaho trees, two trees being attacked during the summer of 1894. All the Idahos were dug up and burned in the fall of 1895, all being dead to the ground. At the same time about one-half of the Bartletts were cremated, and the remainder followed the fall of 1896.

During these years of disappointment and loss we tried all the remedies for blight that we had ever read of in practical or scientific works. We tried washing the trunks and larger branches with strong and heavy forms of the Bordeaux mixture; we tried the sulphur remedy of the Department of Agriculture, the calomel remedy and all the rest, but received not one bit of benefit whatever. About this time the announcement was made by the Secretary of Agriculture at Washington that the department of vegetable pathology had discovered a simple, inexpensive and perfectly successful preventive treatment for pear blight. We at once wrote to Mr. Galloway, chief of that department, requesting the treatment. He promptly replied that it consisted in cutting out with great care each winter the blighted wood, and burning same. It had as well be frankly stated that in recent years the writer has thoroughly and faithfully tested this treatment, and finds it just as ineffective as the rest. This remedy might be very effective if it were not for the wonderful rapidity with which pear blight develops and the awful devastation it can do in a single season.

After we had lost our Idaho and Bartlett trees we felt that at any rate we were secure in our Keiffer and Duchess, for thus far not a tree of those varieties had shown a trace of blight. Many leading horticult-



turists in this and other states had referred to the Keiffer, Garber and Duchess, dwarf, as practically blight proof. We accordingly felt strong in the faith, not only because of what we had heard others say, but especially because of what we had seen in various sections of this State of those varieties.

But at last there came a day of sorrow! At the end of the season in 1897 the first plantng of Keiffers, now of four summers' growth, showed some blight at the tips of the taller branches. The following season—1898—blight was much worse than ever, and thirteen out of sixty Keiffers of the second planting were killed to the ground. Some of the dwarf Duchess were also lost. The following season—last year—blight again continued to increase in intensity. Many of the first planting of Keiffers will be dug up and burned, and nearly all of them are more or less severely affected with the blight.

The past season was certainly the worst on record for the ravages of blight. Young Keiffer trees making only their second season's growth were attacked and killed to the ground, while even Garber did not escape without serious injury.

It is an assumption of almost all scientific authorities who have attempted to find remedies for the blight, that the germ of the disease enters the growing tree almost always through the leaf bud or opening blóssom, but occasionally through the bark on branches or trunk. I am certainly not prepared to say just where the germ enters the sap of the host plant, but I do know that in fully seventy-five per cent of the cases under my observation the first indications of the disease have been upon the trunk or larger branches immediately above the trunk. To cut out the blighted wood in such cases as these would of course be to remove the tree to the ground.

Several leading horticulturists of this State have recently reported that the Keiffer pear showed a remarkable power of recovery after being once attacked by blight. In our experience in our own orchard and observations of our surroundings I have never seen one of these trees recover or bear a crop of fruit or live more than one year after first attacked.

But the ravages of blight have not been our only discouragement in pear culture. By nearly all nurserymen and many prominent fruit-

growers we were led to believe that the Keiffer pear would begin to bear profitable crops of fruit in from four to five years after planting. Although our Keiffer trees of first planting have made now seven summers' growth, yet we have never gathered a crop of fruit from them, nor indeed enough fruit to test its quality. What is here written is not well calculated to encourage our young men to take up pear culture, but it embraces my experience, and it is best always to tell the truth. We have left yet about 250 young Keiffers, free from blight; also the old plantings of Keiffer and dwarf Duchess, more or less infected. These we will watch with interest in the future and may have occasion to inform the readers of the *Western Fruit-Grower* in regard to their fate.

In conclusion we will say that pear culture in this Western country is still in the experimental stage, with not overbright prospects of becoming a commercial success. And yet there may be certain locations and soils of special fitness where pears can be successfully and profitably grown. Where these essential conditions of success can be had, pear culture will be found very profitable; but we would earnestly recommend all planters to go slow until certain they are in possession of the means of success.

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### THE M'PIKE GRAPE.

By Edwin H. Riehl, Madison County, Ill.

For *American Fruit and Vegetable Journal*:

Had we been told some years ago that at this date we would have discovered a grape, the berries of which would be as large as a good-sized plum, measuring nearly an inch and a half in diameter; having every desirable quality, the prediction would no doubt have been received with considerable doubt.

Yet here we are at this point of perfection in the McPike grape. I speak, not from what others say, but from my own observations in a

vineyard containing one hundred bearing vines of the above variety, and all the other leading kinds.

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### LIFE OF STANDARD PEARS.

How long should standard pear trees live? Which two of the standard pears are best for winter?—D. E. S., Shelby Basin, N. Y.

Standard pear trees almost live forever, as one person's life goes, and sometimes outlive several generations of man. There are pear trees near Detroit, Mich., that were planted by the French settlers about 200 years ago. One that my grandfather planted in Ohio, nearly 100 years ago, is yet in bearing condition. The average standard pear tree does not live more than forty years, but if the trees are properly cared for, there is no reason why they should not flourish and bear well for over 50 years. Blight and the "cow with a crumpled horns," which is said to be "the nurseryman's best friend," make away with a large proportion of those that are planted. Many of them die from these causes and neglect, before they have borne a single pear. Two of the best winter pears are Lawrence and Krull.—*Rural New Yorker*.

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### THE KIEFFER PEAR.

By J. C. Evans, North Kansas City, Mo.

(Read before Missouri Valley Horticultural Society.)

There have been a great many things said, and recently there seems to be more than ever before, about this pear. It is not strange that more is being said lately, because a great many sections of country have

had their first good crop on young trees the past year, and the markets at picking time were flooded with fine-looking, well-developed fruit. In the absence of a full crop of apples they seemed more conspicuous and have caused more comments than ever before. In looking over these comments, it is remarkable that scarcely any two agree on any one point, even to the spelling of the name, and you must not be surprised when you hear this, if it differs from all the rest. This is not, however, a comment on the Kieffer pear, so much as on the comments before me. I see one single one says it is good to eat; two say it is a good cooker; two say it is good to preserve, can, and dry—to sell, not to eat—I am reading from several of our leading agricultural and horticultural journals). Some say it is good to grow, but hardly fit for hogs to eat, so that every fellow has his own opinion of it. Go on the market and hear remarks made by people who want to buy something good and you will find them just in keeping with these comments.

It seems to me if there is real merit in this pear, with our boasted progress in horticulture, and as much as we want a good reliable pear, it has taken a long time to develop it.

It is some twenty-five years since Peter Kieffer, of Philadelphia, first introduced it to the public, and only for the efforts of enterprising nurserymen (thanks to them), who wanted to sell trees because they grow quick and easy, still less would be known of it to-day. Its reputation for poor quality seems to have taken an even start with its introduction, and kept up with the trees as fast and as far as they were planted.

It is true, some commercial orchards have been planted in some few sections of the country, and their crops have been marketed with a varied degree of results, from a living profit down to nothing. Very few of these trees have been planted with any regard to soil, location, or other conditions, and when the fruit was marketed it was without any regard to the condition of either the fruit or the markets; but just when the grower thought it was ready to be picked it was rushed off to the nearest market, and in the growers' hurry to get there first they all got there at once, and the result was an overstocked market of fine-looking fruit, but so hard and immature that no one could use the

pears for anything and only those who did not know them would buy. I have seen on the Kansas City market wagon loads of the finest Kieffer pears, some dumped loose into the wagon, like corn, until the wagon was full; others would have them in barrels, in boxes and baskets, and any other conceivable way, all of which had been picked but a few days, and no more fit to be eaten than a green watermelon. At the same time most of the commission houses were receiving heavy consignments from further away places, some as far as 200 miles or more, so that they were overflowing with them, and all in that same unripe condition, and no sale for them.

I estimate that more trees have been planted that are not yet bearing than were bearing a crop last fall, so that, in a short while there will be more than double the amount of this fruit to dump on the market than there was last season. Now it seems to me that we horticultural societies have a problem to solve in finding some way in which we can handle this fruit to better advantage. I believe it can be done in part only. There are so many conditions surrounding a well-developed, highly-colored, juicy, and real good Kieffer pear that would make it impossible to do more. What we want is to learn first what these conditions are, and then make use of as many of them as possible.

The first and most important of those is soil. Any of our soils will grow fine-looking and apparently well-developed Kieffer pears, but a very few of them will produce them of real good quality. I know of no fruit that is so much affected by the soil as this pear. I am not able to say just what elements of fertility the soil should contain to produce the best results. But I do know that a deep black soil—such as we call rich—that will produce 50 to 75 bushels of corn to the acre will not give the Kieffer pear any quality, and I also know that most any of our light-colored soils such as we call poor land (not always true, however), will give more or less a good quality. My attention was first called to this point by the late Mr. Holman, of Springfield, Mo., who said that the Kieffer was almost our best pear. And yet I don't think he had learned its most valuable qualities. I have been a close observer of the Kieffer ever since, and have had opportunity to

test it from most of our Missouri soils, besides those of many other states, and am free to say I have never sampled one that could be called good that did not grow on such land as we call poor, or where the subsoil is red, such as is found in most of the Ozark region.

If the Kieffer pear is planted on such soil, and the trees are not allowed to bear too full, but the fruit is properly thinned at the proper time and picked when not quite ripe—and each specimen wrapped in paper and packed in barrels—bushel baskets are better—and stored in a cellar with a temperature of not more than 50 degrees that will lower a little later to 40 degrees and allowed to remain there until toward the holidays, and then submitted to a temperature of about 60 degrees for a few days, they will be ripe, well-colored, sweet and juicy, and almost as good as a Bartlett.

Now if these pears, grown under favorable conditions, are so much improved by this treatment, of course those grown under other conditions would be improved in proportion under like treatment, besides the advantage of going on the market at a time when they are wanted, and would sell for a good price.

Unless something of this kind is adopted we may some day wish we had not planted so many Kieffers. On the other hand, if even a part of the growers adopt this or some similar plan we will find our market supplied with luscious, juicy Kieffer pears in midwinter and selling at a profit to the grower. Will those who are growing this pear take the hint?

It is not a common practice in Western New York to head in standard pear trees, but Mr. D. K. Bell, of Brighton, has found it profitable. His trees are trained to a street pyramidal shape and the growth of the past season is shortened with a pair of hand-pruning shears. It is a slow and expensive operation, since one man can prune but ten or twelve good sized trees a day: but Mr. Bell finds it pays. What pays can not be assailed by fact or logic.—*American Gardening.*

## AN ORCHARD OF BOSC PEARS.—HOW IT WAS STARTED.

By W. A. Bassette, Seneca Co., N. Y.

Advice for Pear Growers.

Getting a Start.—The orchard contains 100 trees, and was set in the spring of 1896. The trees were obtained of a nearby nurseryman, the Sheldon variety being set. The trees made a vigorous growth, and were in good shape for budding the same year. This was done in August, my nurseryman sending a budder and a tier to do the work.

I paid them for their time and railroad fare, which resulted in an extra expense of about five cents per tree above the original cost. It was necessary to cut the bands in about two weeks, and in the following spring, to prune off all the Sheldon growth, and to watch that none of it grew during the summer. I do not think the idea ought to prevail that it is a difficult matter to start a Bosc orchard. To be sure, it is some bother and trouble to set a tree of one variety, and then change it over to another. But the man who loves his trees doesn't mind this, and the man who does not love his trees, might better never set them out. For those not living within easy distance of a nurseryman, it would be better to buy the trees already budded. They should be ordered the year before they are wanted, and the buyer could select any stock he preferred on which to bud them.

The Best Stock.—Although I have no cause for complaint in the growth my trees have made thus far, were I to set another Bosc orchard, I would use the Kieffer as a stock tree. The union appears to be good, and some of the best orchards are making this combination. The orchard has been plowed each year, and kept cultivated in hoed crops. Each spring, the growth has been cut back from one-third to one-half in order to form a compact, symmetrical head.

Habit of Bosc.—The Bosc makes a somewhat straggling growth, but our poet editor rather overdraws it when he calls it "a feeble, crooked thing—a most outrageous tree." Some of the trees have made a growth of four feet in one season, and many of them already

present as much surface as Seckel and Bartlett varieties set the same year. I was led into growing the Bosc pear from an old tree which my father left on the homstead. Although it was set over 40 years ago, it is still quite vigorous and healthy. It has nearly always stood in grass, and is only of medium size, but it seldom fails to bear over two bushels of choice fruit every year. This is, probably, not a top-worked tree. I have never had any trouble with the fruit rotting.—Rural New Yorker.

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## CLOSING EXERCISES OF THE CARTHAGE HIGH SCHOOL.

### GARDEN, LAWN, AND VINE GROWING CONTESTS— AWARDS MADE—THE PRIZE WINNERS— WILD FLOWER EXHIBIT.

The program in the High School room for the closing exercise of the garden, lawn and vine contests of the past summer was interesting and varied, Superintendent W. J. Stevens, to whom is due a greater portion of the praise and credit for preparing so elaborate a finale to an interesting contest, presiding as master of ceremonies.

The first piece on the program was a piano solo by Miss Fannie Price. Her selection was not only a difficult one to play but was beautiful as well, and fully merited the prolonged applause that followed.

Miss Neva Houck then read an essay on Autumn that was lovely in composition, inspiring in thought, deliberate in planning and nicely delivered.

Miss Sadie Enright followed with a reading from Bryant—"The Goldenrod." Her selection was especially appropriate for the occasion and her delivery was full of expression.

The next number on the program was of a nature to retain the entire interest of the audience. Miss Lulu Van Neman gave an account of her Nature studies in New York last summer. Only a lack of space prevents its reproduction in the *Review*. She has entered so



enthusiastically into her work that, as she says, "it is one continued picnic" for her. Her address was entertaining and instructive.

Miss Mary Wetzel followed with a piano solo. Her technique and expression showed careful training and her selection gave pleasure.

Superintendent Stevens then expressed his gratitude to all who had participated in the garden and vine culture movement. He spoke earnestly and with feeling, reviewing the work done and making suggestions for the future.

Mr. Stevens said fully 1,500 boys and girls started into the contest last spring, but for various reasons they dropped out until but 300 remained.

Mrs. Brader then made a short but interesting talk, telling of the excellent results the Century Club, which she represented and of which she is president, had with the colored school children. She compared their number—90 last year—with the thousand and more white school children and called attention to the proportionate results in favor of the colored children. Each prize winning pupil was presented his or her reward in a neat address.

Dr. L. E. Whitney followed in a fifteen or twenty minute talk on the subject of flowers. He spoke of many other ways of beautifying the city, even where no flowers or vines were grown: this included cleaning up rubbish heaps and removing unsightly objects.

The exhibit was so successful that it will be held again next year. Everyone was more than satisfied with the work and decorations.

No one not in love with Nature would dream of the autumnal voices that speak to the devotees at her shrine. Take for instance the display made by the pupils of room No. 12, under the guidance of their teacher, Miss Lydia Perry, in the wild flower exhibit at the High School last Saturday.

Here among the flowers were wild asters in many varieties of purple and white, goldenrods, still splendid in the glories they stole from a sunbeam, pretty iron weed blossoms, blushing from the good-night kiss of Coeus as he sank behind twilight's walls of gray, brown-eyed Susans, bouncing Betties, ageratums, gorgeous wild poppies, morn-

ing glories that caught and held the tints of the sunrise, false buckwheat, wild senna and man-of-the-ground.

Then, too, came a display of fruits, nuts, berries and seeds. There were buckeyes, osage oranges, gourds in many colors and varieties, walnuts, acorns, hickory nuts, persimmons, coffee beans, hazelnuts, bitter sweets, sumach, buck brush, cockleburrs, greenbriars, and mushroomrooms.

The same displays were found in all the other exhibit rooms in more or less profusion, but in different arrangements.

Miss Lulu Van Neman's botany class had six tables tastefully arranged and carrying different collections. Miss Edith Scott's division of the class had a table arranged with pink and white asters, white and purple ageratums, and green wild buckwheat. It was a beauty. Miss Lulu Vaughn's division arranged their table in white and green—fern leaves, white asters and white ageratums. It also received many compliments for its beauty. Then there was a miscellaneous table with a great variety of flowers and fruits. Ollie Boland's division gave their table a green and yellow effect with festoons of goldenrod and brown-eyed Susans. It was tasteful and pleasing. The "weed patch" contained a rare collection that included a great variety of roadside growth.

Miss Van Neman's mushroom display was one of the most complete ever seen in Carthage, and included nearly every variety grown here, both edible and poisonous. But a plant known as the pitcher plant, which Miss Van Neman brought from New York with her, attracted the most attention when its habits were explained. This plant is a tuber growing in water. Its two upgrowths somewhat resemble tulips, only these are tubes, lined with a kind of hair. Into these tubes insects were attracted by a peculiar odor given off by the plant, and once in, the places that have known them know them no more forever—the plant absorbs them and draws its substance from that source.

Room No. 10 under the direction of Miss Kate Twitchell, was a cozy retreat of beauty and attracted much attention.

Mr. Barnes' room, No. 14, had an artistic arrangement. It was a booth effect and received many compliments from visitors.

No. 8, under Miss Nellie Lee Cate's guidance, had a magnificent arrangement, with many varieties, including a cactus display. The green briar hangings gave the room an inviting aspect and none received more merited praise.

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### HOW HE WON A PRIZE.

Ray Johnson, winner of the vegetable garden prize, tells how he did his work. From two square rods of ground he sold \$6 worth of vegetables, besides furnishing some for family use. At this rate Ray would make his ground produce \$480 an acre. His prize was \$10 in cash.

Briefly, his plans were as follows: He looked over seed catalogues carefully and bought Burpee's vest pocket manual on vegetable gardening, but later found he could learn more from neighbors who had experience in raising vegetables in this climate. Having no means of watering his garden, he planted those varieties that would mature before the summer drouth set in.

He laid off his garden one rod wide and two rods long. The first crop was planted with an eye to beauty as well as profit. His garden was approached from the east and the tallest vegetables were planted at the west or rear end, forming a back-ground for the shorter varieties in front. A row of lettuce planted on the line formed a border to the entire garden.

Onions and radishes occupied the foreground; back of these were bush beans; then Nott's Excelsior peas, with potatoes in the rear.

The soil was thoroughly forked and pulverized. A top dressing of vegetable fertilizer was used and raked in. Two varieties of onions were planted March 7. Lettuce plants started under glass were transplanted to the border of the garden on March 10; potatoes were planted March 11; peas, March 14, and beans April 3; radishes went in about the same time as peas.

These were carefully cultivated and kept entirely free from weeds,

with frequent rakings.

The first crop yielded well and sold readily for a good price. The later crops of course were not so profitable as the earlier, but the sales for the season amounted to a little over \$6.

Before the peas were harvasted, tomato plants were planted between the rows and as soon as the peas ceased bearing they were pulled out and the ground given over wholly to the tomatoes.

When the first crop of beans was harvested, turnips were sown in their stead. When the potatoes were dug, the ground was planted to beans and muskmelons; and when these were gone a third crop of beans was planted, which will be ready before the frosts kill them.

The onions and radishes gave place to a second crop of peas, and these in turn to a crop of rutabagas. Radishes were also sown since the fall rains began and are now ready for the table.

Having no convenient way to water the ground, the tomatoes and beans were heavily mulched with hay to protect the ground from hot sun and winds, and thus retained the moisture. In this way they were kept alive, but the midsummer garden was not so good as the early and late.

A greater variety of vegetables might have been grown, but the size of the garden did not justify it. A second crop of peas was cut short by drouth, and furnished only one good mess and part of another. The tomatoes, which were of the bush or tree kind, and recommended to grow without support, fell over with the weight of the fruit and lay as flat as the old varieties. But, taking all together, the garden was a success and pleasure.

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## THE CULTIVATION OF FLOWERS.

By Leroy Gardiner, National Military Home, Kansas.

Editor Rural World: The love of flowers and the cultivation of them are evidences that true and pure sentiment is in the heart; that a

love for the beautiful has dawned there, and that the elements of progress are at work. One would scarcely love flowers merely because they look beautiful. He who could go no further than this would hardly have perception to go even so far. But when he breathes their fragrance, and witnesses the manifestations of the Creator's love and wisdom in their structure and growth, then, indeed; are deeper and holier sentiments underlying the love of flowers. The care and culture of them elevate and purify the mind, and give the dusty walks of life many a charm that can not be found where they are wanting. They have a refining influence on children, tending to soften and polish their manners, and to inspire them with cheerful views of life.

It is a law of our being that we become attached to those objects upon which we have bestowed labor, and on which we have expended care. We love the trees our own hands have planted, the vines we have cultivated and trained over our doorways, and over the trellis our own hands have constructed.

Cultivated flowers are evidences of high civilization; they are a sort of floral thermometer, indicating in some degree the intelligence and refinement of the people; and their indications are as significant as are the evidences afforded by architecture, painting, poetry, or any of the sciences. The lessons of these gentle teachers are having an influence on the habits and manners of our people. The love of flowers is the love of nature in detail; it is a union of affection and good taste and natural piety. Flowers are the steady, impartial friends of all. They gladden the sick room, and cheer the dusty way of the weary traveler. The bright golden-rod nods over the fence as he passes, and the modest aster peeps from the thicker foliage. The ancients adorned the alters of their gods with flowers. So the curled clematis forms bowers by the wayside, and is called by the country people "Virgin's Bower." It lays hold of the young maple and alders with its clasping tendrils, mounts to the top of the surrounding foliage, and covers it with its gossamer-like blossoms. The French truly call it the "Traveler's Consolation."

The cultivation of flowers and a better knowledge of them will not only have a happy but an enduring influence upon our people. It

will affect the character of our farms and homes. Instead of unclosed dooryards, where stray cattle and gabbling geese are at home, and old wheels and rambling woodpiles skirt the house in dire confusion, while huge dogs, grim as Cerberus, guard the doubtful way to the door, there will be white palings enclosing a spot sacred to "fruits and blossoms that blush in social sweetness on the self-same bough." These will not only attract and please the traveler, but will give the farm an enhanced money value through associations of intelligence, refinement and taste. Children reared in such a home will go forth into the world filled with those sweet affections that soften the harsher aspects of life. Wherever they travel, or trade, or sojourn, they will look back to the old homestead, among whose friendly trees and flowers they passed their early years, as the dearest spot on earth, and one to which every lingering affection will constantly turn.

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#### TREE LIFE AND BEAUTY.

G. J. Diekema, of Holland, discussed "The City's Responsibility Concerning its Tree Life." The State has conferred upon the villages and cities certain privileges, and responsibilities have arisen, which are placed in the hands of certain boards by the city council or supervisors. The city can take steps to protect the health and preserve the peace of the community and should extend its protection to its tree life. Nowhere else can trees look for protection. Trees at best have a hard struggle with telegraph, telephone, street railway, electric light and fire alarm wires, and in stringing wires care should be taken not to injure the trees. If possible the poles should be so high that the wires will clear the trees. The courts have been very liberal in interpreting laws relating to tree life and in fixing damages if they are injured or destroyed. When streets are to be graded, less attention should be paid to securing a perfect level, as oftentimes by leaving a slight crown, handsome shade trees can be saved, that would otherwise have to be destroyed.

Mr. Arend Visscher, of Holland, spoke on "Preserving the Tree Beauty of the Country." In the early days the land was covered with forests and the settlers did not look at the beauty of the trees, but considered how they could quickest and best clear the land for farming. Trees should be protected even against their owners, who often care more for a half-cord of wood than for a beautiful tree, and legislation is needed along this line. Try to instill in the children a love for trees. Let them plant and care for them and call them their own. Interest the public through the newspapers and have arbor days for the planting of trees in parks, school grounds and about the home.

"The Utilitarian View of Tree-Planting" was treated by G. J. Monroe, of South Haven, who said that if planted six feet apart each way they would grow upright, and they would drop the lower branches. In ten years, the smaller trees could be cut for hoop-poles or other purposes; at twenty years, those taken out will answer for fence posts, while at thirty and forty years they will answer for telephone and telegraph poles. The same rule holds true in natural forests, and there the timber should be harvested at its most profitable development for the various purposes for which it is to be used.

Walter Phillips, of Grand Haven, traced the history of forestry. He claimed that forest regions are healthy, and that they should be preserved for their effect in controlling the rainfall. Forests by their fallen leaves form a spongy covering for the ground, and the water falling upon it is held and is given up gradually. Forests retain four-fifths of the rainfall, while but one-fifth is held by cleared land, and the remainder rushes off in torrents..

As showing the "Profits of Woodland," Chas. W. Garfield, of Grand Rapids, cited several instances that have come to his knowledge in an old-settled community. Forty-eight years ago a tract of eighty acres, at that time covered with saplings and a few small pines, was sold for \$150, and the timber on this tract was recently sold for \$8,000. Another tract of one hundred and sixty acres was sold in 1865 for \$800, and since that time has supplied enough firewood to pay the taxes and 10 per cent interest on the cost. The timber on this tract has

just been sold for \$8,000, and the land is worth for farming purposes fully \$8,000. If the fires can be kept out, there are thousands of acres of land in Michigan where the pine has been cut off that will soon be covered with a natural growth of Norway pine, poplar, birch and other soft wood. To-day, poplar for paper is worth more than the best pine twenty years ago.

Prof. W. W. Tracy, of Detroit, presented a paper on "Ornamentation of Highways and School-grounds," in which he urged the importance of doing something to promote the beauty and cleanliness of our highways and school-grounds. The movement can often best be started by village improvement societies. Where these societies have been formed, it has resulted in marked changes for the better.—Country Gentleman.

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### CHRYSANTHEMUMS.

Among the other papers was that of Thos. Gunson, Florist at the Agricultural College, which explained the methods employed in growing chrysanthemums. When produced for cut flowers, the plants are put out in beds at intervals of from six to ten inches each way, and are trained to a single stem by rubbing off the side buds that start. If large flowers are desired, only one is allowed to grow at the tip of each stem, but two or three flowers of good size can be grown upon each plant if properly handled. As soon as the plants are well established, they are given an application of liquid manure once in from five to eight days, until the flowers show color. When grown as pot-plants, as is usual with amateurs, the shoots are generally pinched back from two to three times, when six or eight inches long, and only one flower is allowed to form on each.—Country Gentleman.



## INDIVIDUALITY IN GARDENS.

Would that all who indulge in a garden had some design in its elaboration! Then should we see more reality, more life in each garden spot, let it be ever so small and circumscribed. The mere repetition of a garden seen elsewhere will never inspire one to higher development and can not be termed a successful effort, even though the one reproduce in every detail the features of the other. A garden to satisfy must be the reflection of individual taste. Then it is instinct with life and the progress of vegetation from the budding of spring to the maturity of fall, and even the passing into the dreary sleep of winter becomes an absorbing interest.

The word design in this connection is used as signifying a pre-conceived idea, a mental conception and not as a geometrical plan. It is the effort to convey a feeling, to give it expression so that it can impress another, that constitutes art, and the honest effort to accomplish this is more honorable, more gratifying of result, than a mechanical transfer or plagiarism of something else, which may, after all, not be properly suited to the new surroundings to which it is transported.

Color is a factor in artistic gardening that must be considered seriously. While harmony of form, or composition, is important yet it must also be considered in regard to the color effects. Indeed, to many people it is the latter quality that mostly strikes the fancy when the garden is in question; and in actual practice it is perhaps easier to follow a scheme of color than one of form. This is especially true, of course, of small gardens, such as are mostly in need of close attention. A large garden area will present some scenes of beauty no matter how badly designed, because the most irrational grouping of plants will be to a large degree rectified by Nature's own growth. It may be taken as an axiom that no setting of plants can be ugly; it may be ridiculous. A so-called landscape gardener's reputation has sometimes been created in spite of his work. A skillful application of color may have the effect of giving depth and breadth to a moderate-sized place. Thus to cite the prime essentials, blue gives depth and distance, while yellow foreshortens. A bed of scarlet flowers gives

a definite measuring point, and white merely gives light and air except in a few special situations where contrast enters into the combination. The white bark of the Birch at the end of a vista of green and dark tones adds to the apparent depth and gives an impression of an open space at that spot, thus inviting the observer to wander along. These then are hints from which it is hoped a few practical deductions may be made.

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### THE HYGROMETER IN OUR GREENHOUSES.—HOW TO MEASURE THE MOISTURE.

By L. Wild, Gardener to Mrs. Alfred du Pont, Wilmington, Del.

Many growers are making serious mistakes in keeping their rose houses and graperies at a fixed temperature during the night, and in dull, cloudy weather regardless of the atmospheric condition, both of the houses and the open air. In my opinion it is of the most importance in the fall of the year, and in mild open winters to always take into consideration the degree of moisture in the air of our greenhouses, and the reading of the barometer out of doors; for this reason every rose house at least should be supplied with a hygrometer.

The temperature of the houses ought to be regulated strictly in accordance with that amount of atmosphere moisture essential for the well being of the varieties of roses grown.

While it is injurious for most kinds of roses to have the temperature drop below, or rather as low as the dew point, for any length of time, and at any season, yet they differ widely both in regard to the proximity the temperature may approach that dew point, and the dew point itself; that is, that degree of heat at which part of the atmospheric moisture condenses. The Meteor, for instance, will produce perfect flowers only if the temperature be kept six degrees above the dew point during the night and the dew point at sixty-four degrees.

To keep the house simply at seventy degrees is not sufficient, as temperature alone can not influence the dew point materially, because the latter depends also upon the amount of moisture contained in the air. A house kept seventy degrees may have the dew point at fifty-five degrees unless moisture is supplied artificially to raise it to the degree desired. Try once, for instance, and keep your propagating house at sixty-five degrees and let the dew point be likewise at sixty-five degrees all night, and you will certainly get the finest crop of fungus in your sand and the worst damp off leaves you ever saw. Again, let the temperature be as above and the dew point at forty-five degrees, and your cuttings will surely not be able to stand up next morning.

The elevation above the sea level also exerts a considerable influence on the condition of the atmosphere, especially so far as humidity is concerned, and this is doubtless the cause why so many kinds of roses do well only in certain localities. The reason is obvious. The amount of moisture in the air or the vapor pressure is in a high degree depending upon the atmospheric pressure and the climate of a locality; however, all these local disadvantages could be overcome by the use of the hygrometer, with the aid of which we are able to produce any climate adapted for the perfect culture of certain kinds of roses.

I am inclined to believe that without this instrument as a guide the grower is virtually groping in the dark. To me the use of the hygrometer was a revelation, revealing to me as it were the cause of all my failures and success in propagating and growing roses. I am convinced that the knowledge of the right proportion of heat and atmospheric moisture is very important both for the propagator and grower, and in order to acquire that knowledge they must be able to measure both those factors. It is true growers are very careful in measuring the temperature, but it never enters their minds to ascertain the amount of moisture contained in the air.

Cuttings will form a callus only while evaporation is going on: once evaporation stops, the action of the sap in the cuttings will cease and consequently no callus or roots will form during that time, and if evaporation stops for any length of time the callus already formed will turn black and the leaves commence to damp and drop off.

The cuttings have been checked. All this may happen although the temperature never dropped below sixty degrees and the leaves look apparently dry. The nearer the temperature coincides with the dew point the more insufficient evaporation will be. The appearance of fungus can also be traced back to the same origin. On the other hand, too much evaporation will cause the cuttings to shrivel and wilt. In my experience, however, I have always found it easier to handle cuttings under a comparatively low vapor pressure than under a high one.

There is no doubt a wide field open for the investigator and practical observer in this respect. Every locality requires its own experiments and observations, and general rules can not be laid down. In growing roses for cut flowers during the fall and winter months many growers have failures to report, notwithstanding the fact that they have exerted all the skill and knowledge which in former years have led them to success. The seasons are not the same every year, and consequently varieties which can do well under certain atmospheric and climatic conditions only must fail if those conditions do not exist. This is especially the case with varieties which are not acclimatized; unless we provide for their wants artificially we can not grow them.

To tell our fireman, therefore, to keep such and such a house at such and such a temperature, no matter whether it is raining out of doors in torrents, or the thermometer registers thirty-five degrees below zero, is simply absurd. In the former case the atmosphere in the houses is very likely saturated with moisture, and in order to keep the right relation between temperature and humidity we are obliged to keep the house a few degrees warmer; in the latter case the vapor pressure is very light, and if we keep the house at too high a temperature we shall roast our plants, except the proper amount of moisture has been supplied to the air artificially.—*American Gardening.*

## STORY-TELL LIB.

By Annie Trumbull Slosson, in Sunday School Times.

Her real name was Elizabeth Rowena Marietta York. A stately name, indeed, for the little crippled, stunted, helpless creature, and I myself could never think of her by any name but the one the village people used, Story-tell Lib. The village folk had talked to me of the little lame girl who told such pretty stories out of her own head, "kind o' fables that learnt folks things, and helped 'em without bein' too preachy." But I had no definite idea of what the child was till I saw and heard her myself. She was about thirteen years of age, but very small and fragile. She was lame, and could walk only with the aid of a crutch. Indeed, she could but hobble painfully, a few steps at a time, with that assistance. Her little white face was not an attractive one, her features being sharp and pinched, and her eyes faded, dull, and almost expressionless. Only the full, prominent, rounding brow spoke of a mind out of the common. She was an orphan, and lived with her aunt, Miss Jane York, in an old-fashioned farmhouse on the upper road.

She could not read a word, she did not even know her alphabet. I can not explain to myself or to you the one gift which gave her her homely village name. She told stories. I listened to many of them, and I took down from her lips several of these. They are, as you will see if you read them, "kind o' fables," as the country folk said. They are all simple little tales in the dialect of the hill country in which she lived. But each held some lesson, suggested some truth, which, strangely enough, the child herself did not seem to see; at least, she never admitted that she saw or intended any hidden meaning.

Be that as it may, certain of these little stories seemed to touch her own case strangely. Such was the first one I ever heard her tell, a story of the closed gentian, the title of which she announced, as she always did, loudly, and with an amusing little air of self-satisfaction.

The Shet-up Posy.—Once there was a posy. 'Twan't a common

kind o' posy, that blows out wide open, so's everybody can see its out-sides and its insides too. But 'twas one of them posies like what grows down the road, back o' your pa's sugar-house, Danny, and don't come till way towards fall. They're sort o' blue, but real dark, and they look 's if they was buds 'stead o' posies—only buds opens out, and these doesn't. They're all shet up close and tight, and they never, never, never opens. Never mind how much sun they get, never mind how much rain or how much drouth, whether it's cold or hot, them posies stay shet up tight, kind o' buddy, and not finished and humly. But if you pick 'em open, real careful, with a pin—I've done it—you find they're dreadfully pretty inside.

You couldn't see a posy that was finished off better, soft and nice, with pretty little stripes painted on 'em, and all the little things like threads in the middle, sech as the open posies has, standing up, with little knots on their tops, oh, so pretty—you never did! Makes you think real hard, that does; leastways, makes me. What's they that way for? If they ain't never goin' to open out, what's the use o' havin' the shet-up part so slicked up and nice, with nobody never seein' it? Folks has different names for 'em, dumb foxgloves, blind genshuns, and all that, but I allers call 'em the shet-up posies.

Well, 'twas one o' that kind o' posy I was goin' to tell you about. 'Twas one o' the shet-uppest and the buddiest of all on 'em, all blacky-blue and straight up and down' and shet up fast and tight. Nobody'd ever dream 'twas pretty inside. And the funniest thing, it didn't know 'twas so itself! It thought 'twas a mistake somehow, thought it had oughter been a posy, and was begun for one, but wa'n't finished, and 'twas terr'bly unhappy. It knew there was pretty poises all 'round there, goldenrod and purple daisies and all; and their inside was the right side, and they was proud of it, and held it open, and showed the pretty lining, all soft and nice with the little fuzzy yeller threads standin' up, with little balls on their tip ends. And the shet-up posy felt real bad; not mean and hateful and begrudgin', you know, and wantin' to take away the nice part from the other posies, but sorry, and kind o' shamed.

"Oh, deary me!" she says—I most forgot to say 'twas a girl posy—"deary me, what a humly, skimpy, awk'ard thing I be! I ain't more'n half made; there ain't no nice, pretty lining inside o' me, like them other posies; and on'y my wrong side shows, and the't just plain and common. I can't chirk up folks like the goldenrod and daisies does. Nobody won't want to pick me and carry me home. I ain't no good to anybody, and I never shall be."

So she kep' on, thinkin' these dreadful sorry thinkin's, and most wishin' she'd never been made at all. You know 'twa'n't jest at fust she felt this way. Fust she thought she was a bud, like lots o' buds all 'round her, and she lotted on openin' like they did. But when the days kep' passin' by, and all the other buds opened out, and showed how pretty they was, and she didn't open, why, then she got terr'ble discouraged; and I don't wonder a mite. She'd see the dew a-layin' soft and cool on the other posies' faces, and the sun a-shinin' warm on 'em as they held 'em up, and sometimes she'd see a butterfly come down and light on 'em real soft, and kind o' put his head down to 'em's, if he was kissin' 'em, and she thought 'twould be powerful nice to hold her face up to all them pleasant things. But she couldn't.

But one day, afore she'd got very old, 'fore she'd dried up or fell off, or anything like that, she see somebody comin' along her way. 'Twas a man, and he was lookin' at all the posies real hard and partic'lar, but he wasn't pickin' any of 'em. Seems's if he was lookin' for somethin' diff'rent from what he see, and the poor little shet-up posy begun to wonder what he was arter, and bimeby she braced up, and she asked him about it in her shet-up, whisp'rin' voice. And says he, the man says: "I'm a-pickin' posies. That's what I work at most o' the time. 'Tain't for myself," he says, "but the one I work for. I'm on'y his help. I run errands and do chores for him, and it's a partic'lar kind o' posy he's sent me for to-day." "What for does he want 'em?" says the shet-up posy. "Why, to set out in his gardin," the man says. "Te's got the beautif'lest gardin you ever see, and I pick posies for 't." "Deary me," thinks she to herself, "I jest wish he'd pick me. But I ain't the kind, I know." And then she says, so soft he can't hardly hear her. "What sort o' posies is it you're arter this time?" "Well,"

says the man, "it's a dreadful sing'lar order I've got to-day. I got to find a posy that's handsomer inside that 'tis outside, one that folks ain't took no notice of here, 'cause 'twas kind o' humly and queer to look at, not knowin' that inside t'was as handsome as any posy on the airth. Seen any 'o that kind?" says the man.

Well, the shet-up posy was dreadful worked up. "Deary dear!" she says to herself, "now if the'd on'y finished me off inside! I'm the right kind outside, humly and queer enough, but there's nothin' worth lookin' at inside—I'm certain sure o' that." But she didn't say this nor anything else out loud, and bimeby, when the man had waited, and didn't get any answer, he begun to look at the shet-up posy more partic'lar, to see why she was so mum. And all of a sudden he says, the man did,; "Looks to me's if you was somethin' that kind yourself, ain't ye?" "Oh, no, no, no!" whispers the shet-up posy. "I wish I was, I wish I was. I'm all right outside, humly and awk'ard, queer's I can be, but I ain't pretty inside—oh! I most know I ain't." "I ain't so sure o' that myself," says the man, "but I can tell in a jiffy." "Will you have to pick me to pieces?" says the shet-up posy. "No, ma'am," says the man; "I've got a way o' tellin', the one I work for showed me." The shet-up posy never knowed what he done to her. I don't know myself, but 'twas somethin' soft and pleasant, that didn't hurt a mite, and then the man he says, "Well, well, well!" That's all he said, but he took her up real gentle, and begun to carry her away. "Where be ye takin' me?" says the shet-up posy. "Where ye belong," says the man; "to the gardin o' the one I work for," he says. "I didn't know I was nice enough inside," says the shet-up posy, very soft and still. "They most gen'ally don't" says the man.



## ONE OF INGALLS' "PRETTIEST" BITS.

From "Blue Grass," in *Kansas Magazine*.

Grass is the forgiveness of nature—her constant benediction. Fields trampled with battle, saturated with blood, torn with the ruts of cannon, grow green again with grass, and carnage is forgotten. Streets abandoned by traffic become grass-grown like rural lanes, and are obliterated. Forests decay, harvests perish, flowers vanish, but grass is immortal. Beleaguered by the sullen hosts of winter, it withdraws into the impregnable fortress of its subterranean vitality, and emerges upon the first solicitation of spring. Sown by the winds, by wandering birds, propagated by the subtle horticulture of the elements which are its ministers and servants, it softens the rude outline of the world. Its tenacious fibers hold the earth in its place, and prevent its soluble components from washing into the wasting sea. It invades the solitude of deserts, climbs the inaccessible slopes and forbidding pinnacles of mountains, modifies climates, and determines the history, character and destiny of nations. Unobtrusive and patient, it has immortal vigor and aggression. Banished from the thoroughfare and the field, it bides its time to return, and when vigilance is relaxed, or the dynasty has perished, it silently resumes the throne from which it has been expelled, but which it never abdicates. It bears no blazonry of bloom to charm the senses with fragrance or splendor, but its homely hue is more enchanting than the lily or the rose. It yields no fruit in earth or air, and yet, should its harvest fail for a single year, famine would depopulate the world.

## INGALIS' BEST POEM.

## OPPORTUNITY.

Master of human destinies am I!  
Fame, love and fortune on my footsteps wait,  
Cities and fields I walk; I penetrate  
Deserts and seas remote, and passing by  
Hovel and mart and palace, soon or late  
I knock unbidden once at every gate!  
If sleeping wake, if feasting rise before  
I turn away. It is the hour of fate,  
And they who follow me reach every state  
Mortals desire, and conquer every foe  
Save death; but those who doubt or hesitate,  
Condemned to failure, penury and woe,  
Seek me in vain and uselessly implore,  
I answer not, and I return no more.

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## NATURES' BEAUTY.

By a Lover.

I will not sing the praises of the vulgar display which proud wealth is tempted to make, for that would be the very antipode of the spirit of this occasion. But you who have been born and reared in the sweet English love of the garden will rejoice that America is now, more and more, showing her ethical and spiritual evolution in the abundant and significant uses to which she is putting flowers. Every year I see an increasing number of men, morning and evening, busy about their lawns and beds and borders, translating their own ethical

and spiritual growth into the language of the beautiful products of the soil, and putting sweeter meaning into the word "home." Within the past decade our school yards have begun to add on this branch of education. And now our railroad stations, not so much as yours, but following your example, and with a prophecy of progress, have recently begun a lively competition in substituting little slices of paradise for the unsightly remnants of chaos that formerly prevailed.

That the commercial greed of a rapidly growing nation should so soon become amenable to these finer ethical and æsthetic tastes is one of the greatest encouragement to optimism. And I feel quite sure that America has overtaken Europe in the magnificent and elaborate layout, of the floral part, at least, of our public parks and gardens. We pay our compliments in flowers. We make love with flowers. We worship God with flowers in our church decorations. I live among them all the week, and unless I can preach from the midst of them I miss their inspiration. In our weddings the old, conventional, orange blossoms have given way to elaborate floral decorations, defying description. And we disguise the gloom of the grave and transfigure our affection and faith with floral tributes of unstinted cost. 'Tis but a step from the patriotism that decorates a soldier's grave annually with blossoms, to that manly occupation or diversion in which we give our surplus energy to the development of the highest floral art. We preach floriculture as a hobby to busy men, who are in danger of suicidal application to business.

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### PEACH RULES.

J. G. Hale has given the following ten rules for success in peach growing:

1. High, dry, sandy or sandy-loam soil.
2. Careful selection of varieties most hardy in fruit bud.
3. Vigorous, healthy seedling stocks, budded from bearing trees of undoubted purity and health.

4. Trees given the entire possession of the land from the start.
  5. Thorough culture from the beginning of spring until the new growth is well along.
  6. Liberal annual manuring, broadcast, with commercial manures rich in potash, and phosphoric acid and lacking in nitrogen.
  7. Low heading and close annual pruning for the first five years.
  8. Keep out most borers with some suitable wash, and dig out all others.
  9. Search for traces of the yellows every week of the growing season, and at first sight pull up and burn every infected tree.
  10. Thin the fruit so that there shall never be what is termed a full crop.
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### LIQUID AIR INSTEAD OF ICE.

The Fay Fruit Company, of Los Angeles, says the Times, has made arrangements with Charles E. Tripler to use his processes and appliances for the manufacture of and employment of liquid air. The particular end in view is to equip the refrigerator cars of the company so that liquid air can take the place of ice.

Since the company ships east yearly more than 2,000 carloads of citrus fruit, vegetables, dried fruits and nuts, and the great bulk of its shipments must be made in refrigerated cars, this one phase of the matter is highly important. The plant which will be installed for liquefying air will also supply magic substances for use in every other conceivable way. F. B. Fay and his associates of the Fay Fruit Company are believed to have "got in on the ground floor" of a very important enterprise, whose consequences will be far reaching.

Mr. Tripler has broken a record and demonstrated the possibility of using liquid air for refrigerating cars in which perishable goods are shipped by sending liquid air from New York to Chicago—a distance of 1,000 miles.

## GRAFTING.

By Chas. A. Scott, Manhattan, Kansas.

Grafting consists in placing two portions of a plant or of different plants containing living cambium, in such a way that their cambium layers are maintained in intimate contact. The root part, or that part destined to become the root, is known as the stock. The portion to become the top is the scion, or bud.

The chief purpose of grafting is to perpetuate a variety of fruit which does not reproduce itself from seeds. This object is accomplished by taking a scion from the variety desired to propagate and grafting it upon a seedling root.

Another object gained by grafting is the hastening of maturity and fruiting of slow-maturing varieties. This is brought about by grafting a mammoth variety upon a dwarf stock. Such a union in all probabilities will produce a smaller tree that will reach maturity and bare fruit sooner than the parent tree.

When limbs have been broken off by wind or injured by insects or vermin, grafting is resorted to as a means of restoring the top. The injured parts are cut away and grafts are inserted. With proper care and training the injured parts will, in a few years, be unnoticeable. Such work is called top grafting.

Grafting may be employed as the means of adopting varieties of trees to uncongenial soils. This may be accomplished by taking scions of the desired variety and grafting them upon roots belonging to the same genus that grow well in the soil desired for a plantation. Grafting has also proven a valuable means of preventing insect destruction. For example, we may consider the European grapes. They can not now be grown on their own roots, even in Europe, because of destructive root insects, but when grafted upon the resistant American stocks they are grown with marked success.

Grafting finds favor among all nurserymen, because of the rapidity it affords in propagation. A skilled workman can make

from twenty-five hundred to three thousand grafts per day, a large percentage of which will live when properly cared for.

Grafting can be performed at almost any time of the year, but the practice must be varied to suit the season and other conditions. The one essential point is to be sure the cambium layers lying between the bark and wood meet as nearly as possible in the scion and stock. This cambium is always present in living parts, forming woody tissue from the inner surface and bark from its outer surface. It is necessary to cover the wounds in order to check evaporation. This is done by covering the wound with an application of wax, or by wrapping the parts tightly together with waxed cord.

The method of grafting commonly employed is whip grafting; the scion stock should be about the same thickness; a convenient size is when their diameter is about equal to that of a lead-pencil. Both are cut off with a sloping cut, about one inch long, after which a tongue is formed in each by splitting the wood longitudinally a short distance. In joining, the tongue of the scion is inserted into the slit of the stock, so that the cambium lines of the scion and stock coincide at least on one edge, the two are crowded together and wrapped firmly with waxed cord, to hold them in position until the two parts unite.

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### THE NATION WILL EDUCATE FARMERS.

The government is wise in its decision to make the "study of the soil" an important feature of the system of public education that is to be established in our insular possessions. The inhabitants of Cuba, and Puerto Rico must look to farming for their industrial salvation for many years to come rather than to mining, manufacturing or merchandising. Instead of teaching the natives bookkeeping and type-writing they should be taught how to get the most out of the fertile soil that is their great possession.

Schools for the study of the soil, with reference to its highest productivity and its adaptability for certain classes of products, have been conducted with great success in Germany. A plot of ground is connected with each school, which is set apart for analysis of the soil and for experimentation in the production of grains and vegetables. Through these experiments certain facts pertaining to the adaptability of particular soil elements to the growth of particular farm products are established, and husbandry based upon this knowledge approaches the status of a fixed science.

This is the kind of instruction which, combined with the more practical branches taught in the common schools, will be of most inestimable value to Cubans, Puerto Ricans and Filipinos. In fact, greater prominence might be given to this study in the common schools of this country with much profit to the general interests of husbandry, upon which the nation largely depends for its prosperity.

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### A NEW PACKING MATERIAL FOR FRUITS.

An interesting experiment has just taken place in the matter of packing fruits in the colony of Victoria for shipment to England.

As is pretty generally known, apples and pears are now brought from the Cape of Good Hope and from the Australian colonies in boxes holding a bushel, which are stored on board ship in cool chambers. The fruits are merely wrapped in tissue paper and placed in the boxes.

Under this system, apples have for the most part come very successfully; but pears have been less satisfactory. Occasionally there have been pears from the Antipodes that have reached this country in a sound condition, but numerous consignments have proved to be of little value, and the commission agent is never able to speak of such

fruits or to gauge their value until they have been unpacked. The freight per bushel, from Victoria to London, for apples or pears so packed and stored on board ship in cool chambers, is 3s. 9d.

Instead of packing the apples wrapped in tissue only, in the case of several bushels that have recently arrived in London by the S. S. Wakood, a quantity of asbestos, or a preparation of this substance, has been used. The fruits were wrapped in tissue as formerly, and afterward embedded in the asbestos, each fruit being perfectly surrounded by this substance. Upon unpacking the case, the asbestos appeared to be caked, but it was easily broken up, and then appeared almost like flour. We should suppose, therefore, that the fruits would be air-tight under such conditions, and this will account for the fact that as we saw them they were perfectly sound, and in excellent condition, although five months had elapsed since they were packed in the boxes. The apples were gathered and packed previous to May 5 last, but owing to some objection, we believe, on the part of the steamship companies, there was a delay of two months or more before shipment, and even then they traveled by the Cape route. The new system, should it answer to expectations, will possess several advantages: The fruit may then be stored in the hold of the ship and the freight per bushel case will be 6d. instead of 3s. 9d.; but as the packing material will displace a quantity of the fruits in each package, it may be well for present purposes to describe the future freight of the fruit as 1s. per bushel.

It must be remembered also that the asbestos is a valuable material in England, and it will be sold to as much advantage as will the apples. The result will be that the asbestos and fruit would be brought to England for less money than is now paid for the fruits alone.—*Gardeners' Chronicle.*



## FERTILIZERS.

By Bryon Tyson, Long Leaf, N. C.

Among the plants belonging to the leguminous family are clover, peas, beans and vetches, and, in order to get the benefit of their nitrogen gathering capacity, every farmer should endeavor to grow some one of said crops, the one that may be most suitable for his land.

If nitrogen is not supplied in this way, the farmer will have to purchase it in the form of nitrate of soda, sulphate of ammonia, cotton-seed meal, dried blood, fish scrap, tankage, bone meal, etc.

Phosphoric acid, the second mentioned ingredient, can be furnished from acid phosphate, bone meal, dissolved bone or bone black. This element is much cheaper than nitrogen, but is equally as important.

Potash comes in the form of muriate of potash, sulphate of potash, double manure salt, kainit and wood ashes. The last mentioned is somewhat irregular in composition.

The three essentials above described constitute what are called nutritive fertilizers, and when a farmer wishes to fertilize his land he has only to concern himself about them.

It is well to remember, though, that neither ingredient can replace the other, nor can a superabundance of any one compensate for a deficiency of a second. It is something like a chain which is never any stonger than its weakest link.

To illustrate, if there is only enough nitrogen in the soil to produce a crop of twenty bushels of potatoes, no extra amount of phosphoric acid and potash will cause the crop to produce more. The only way to do is to make all three of the links of corresponding strength. Each ingredient is of equal importance and it is absolutely essential that a sufficiency of all be supplied to produce a full crop.

The subject of plant feeding is, after all, merely a matter of understanding the composition, uses and properties of the raw materials which furnish nitrogen, phosphoric acid and potash.

## CULTIVATION OF ORCHARDS.

By J. C. Whitten, Horticulturist. Missouri Experiment Station, Columbia, Mo.

The peach should be cultivated as previously recommended for apples. It has been claimed by many that since the peach makes a very rank growth, and frequently prolongs its growth until late in autumn, cultivation should cease very early, in order to give the wood time to ripen for winter. This may be true if there is abundant rain in August and September. If late summer and early autumn are dry and hot, or if the trees are carrying a heavy crop, our experience indicates that the land should be kept in good tilth until the crop is harvested. Peach trees are more liable to suffer from immaturity of tissues, due to insufficient moisture in August or September than they are from immaturity of tissue induced by prolonged autumn growth.

Standard pears and cherries usually succeed best if the land is cultivated until they reach bearing age, and then seeded to clover. Dwarf pears should be given the best of cultivation. Plums do best under clean cultivation but the Americans will succeed fairly well in clover or even in blue grass pasture. Japanese plums should be treated about the same as the peach.

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## HANDLING THE PEACH CROP..

By W. D. Hinds.

This is the most difficult part of the business of peach culture. Most anyone can pick green peaches and throw them on the ground. But when you want help to pick peaches that are just ready to be picked, help who will pick all that are ready and not get some that are unripe, and should hang a day or two more, you will find this class of help very scarce and hard to secure.

Two years ago when we had a large crop I kept going over my orchards when they commenced to ripen and gleaned all that were ready and some that would have been better if they hung a day or two more. My brother and the commission men all began to find a little fault because there were some a little too hard. My brother said he wasn't going to pick his until they were ripe. He wanted them ready to eat when they reached the market. I said to him, "I am afraid you are missing it, that you don't pick more fruit." Well, one night there came a thunder shower and a wind such as I never want to see in a peach orchard. The day before the shower was a hot one. Peaches mellowed fast, and the result was, my brother had over 500 baskets to pick off the ground of bruised, dirty fruit that must all be brushed, and then it was worth only half-price. So of the two horns of the dilemma, I prefer to pick a little too soon rather than let them get ahead of me and begin to drop. Then if a wind does come, we have the feeling, well I have done the best I could, and saved so much anyway.

Having the fruit picked, the next step is to carry it to the packing tables. This we found could be best done by use of the racks we made to ship them in by the carload. These are six feet long and hold seven baskets, two men carrying seven baskets very easily. For packing, I prefer girls or women. They have better taste and will handle the fruit more carefully than men and boys. We make about four grades, extras, 1st, 2d and 3d. This method puts the fruit in the best possible condition to suit all classes of pocketbooks. There are people who will buy nothing but the best and are ready to pay for it, while there are others who are just as well satisfied with a cheaper grade and who can not afford the higher priced fruit, so we think careful sorting and grading pays.

Now we are ready for the marketing. Some weeks before this we find it a good plan to do a little advertising around the home towns. Have three or four good peddlers engaged either by the day or on commission; enough to handle about all of the second and third grades and some of the firsts. This relieves your big markets of so much, and your saving of freight and commission will about pay for peddling the

fruit. Then this fruit being put right into consumers' hands, is soon eaten or canned and there is no waste. Whereas if it had been sent to a wholesale house, by the time it had been sold and had reached the consumer, a large percentage is wasted. The fancy and No. 1 fruit, having gone to a market where there is plenty of money and customers who want the best and are willing to pay well, it brings a satisfactory price.—Orange Judd Farmer.

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#### BI-SULPHIDE OF CARBON FOR THE DESTRUCTION OF INSECTS IN STORED SEEDS.

With the fall of each year regularly comes the request from many subscribers that we tell them how to destroy the pea or bean weevil.

The remedy for this pest is a simple one and not difficult to apply; but must be handled with great care. Bi-sulphide of carbon is the material to be used. It is a very foul-smelling, volatile liquid, as clear as water, the fumes of which are several times heavier than air. They create a death atmosphere in which no animal can survive. The material can be placed directly upon the grains without the least deleterious effect, so far as injury to the germ is concerned and it does not hurt the edible properties either. Although a very foul smelling liquid, it leaves no bad after effect, and is sure death to insects wherever it reaches them. The material can be bought at about 10 cents per pound.

Prof. W. G. Johnson, Maryland State Entomologist, says that from one to two pounds of the material is all that is necessary for every hundred bushels of grain in store, or the same amount for every thousand cubic feet of space. The amount used depending upon the tightness of the building or bin and the intensity of the attack. If the bin is very tight, one pound of bi-sulphide to every hundred bushels will be sufficient. If open use two pounds.

In applying the chemical, after the capacity of the bin or house has been determined, it should be placed in tin pans, soup plates, or any vessel with a large evaporating surface and set around directly on top of the grain. The room or bin should be closed as tightly as possible and left for at least twenty-four hours. Prof. Johnson advises its use in pans or soup plates, as the fumes are kept more constant for a greater length of time, as evaporation is gradual, and better results are secured.

Caution: It must be borne in mind that this material is a very explosive one, when the fumes are mechanically mixed with air; therefore it must be handled with caution during the fumigation of a house or bin. Especial care should be taken that no lights or persons with a light of any kind, even a cigar or pipe, are allowed around the room or building.

With this caution, there need not be any fear to persons applying it, as a reasonable amount can be inhaled without injury during the operation. Of course it is necessary for the person applying the material to get out of the building as soon as possible.—American Gardener.

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### WATCH THE CELLARS AND PACKAGES.

The Colorado Board of Horticulture issues a bulletin in which the following statements are made:

When wormy apples are put in the cellar in bins, boxes or barrels, the worms may be destroyed if the following directions are heeded: About May 1 to 10 these worms begin to hatch into millers—the Codling-moth. If there is a window in the cellar they may all be caught by placing a funnel in a funnel made of mosquito bar over a funnel-shaped frame. The small funnel will admit them into the larger funnel and once inside they are safe. The door to the cellar must be kept closed while trapping them.

For some years I have bought second-hand apple barrels in Denver for my next year's crop. I have a cellar that holds 1,000 barrels.

From March to May 1, I used to burn sulphur in the cellar, thinking it would kill the worms and millers as they hatched out, but the apples kept getting more wormy. Fumigating did no good—it will not kill one worm out of 100. The barrels and boxes ought to be scalded. I have a large kettle that I use for that purpose. They ought to be kept in the boiling water long enough to be sure the worms are dead—about a minute to the barrel will kill them.

There is no question but that thousands of Codling-moth caterpillars leave the apples after they are packed and placed in crates, barrels, or store-rooms. These caterpillars spin their cocoons in any angular spot in the place where the apples are stored. Thus in using old crates and barrels one is very apt to introduce many of the pests into his locality, hence where the insect is a new pest, or does not occur at all, it would be advisable to scald such crates or barrels. It is doubtful whether fumigation with anything else than hydrocyanic acid gas or carbon bisulphide would destroy caterpillars in their cocoons on the crates. One can easily demonstrate that thousands of the moths are bred in store-rooms or cellars where apples are stored, hence one should always use the means described by the Colorado apple growers to prevent those moths from getting out of store-rooms. Another way to accomplish this would be to screen all windows and doors with fine wire netting. The moths will not live more than two or three weeks after emerging, and if they can not get out must die in the store-room, where they will do no harm.

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## HOW TO FEED THE FRUIT CROPS.

Written for The Southwest, by H. E. Van Deman.

What shall I use this year to manure my orchards and other fruit plantations? Doubtless this is a question that many are asking themselves. The answers will be, and should be, varied. Some will use stable manure; some, commercial fertilizers of one kind, and others,

a hundred other kinds perhaps; while many will use none of any kind. Possibly there may be lands so rich that orchards, etc., planted on them may need no manures of any kind, but such cases are rare. There are few fruit soils that would not be benefited by some manureing, and most of them should have it in abundance.

There is nothing better for most fruits than good stable manure. However, there are strawberry growers who would not thank anyone to haul it upon their plantations of that fruit. They claim that it makes the berries soft and too tender to ship well. This may be true in some cases, and yet there are more strawberry fields starving for the lack of stable manure than there are those injured by too much. One of our largest and best peach growers claims that he never wants a load of stable manure hauled into his orchards, feeling sure that it would hurt his crop. He prefers commercial fertilizers and soiling crops. On the other hand, I know several good peach growers, judging by their crops of large and delicious fruit, that want all they can get of it. One farm that I know had about forty carloads applied during one fall, and the succeeding crop paid for it, and much more.

Stable manure is good for apple orchards, vineyards and all kinds of berry patches, if applied wisely. There is more danger of getting on too little than too much; although this, as well as most other good things, can be overdone. The main difficulty is in not having enough to go around. If large amounts of stable manure are used, it is best to supplement it by adding an ample amount of sulphate of potash, and also acid phosphate, or dissolved bone. This is for the reason that stable manure contains an excess of nitrogen as compared with phosphoric acid and potash; in other words, it is not a well balanced, complete fertilizer. If stable manure be used exclusively, it is liable to produce too much wood and too little fruit.

The plan of using commercial fertilizers and soiling crops as a substitute for stable manure is a very good one, and has been adopted by many good farmers and fruit growers. Some have entirely abandoned the business of buying manure from the cities and towns because of the cost of labor in hauling it, to say nothing of the price paid for the manure. There are much of these manures that are mostly trash and

water, and in some cases the manure is thoroughly soaked with water from a hose after being loaded on the cars and before weighing, the charge made according to the tonnage, of course. It is doubtless true that in many cases this trash and water can be secured at home from soiling crops much cheaper, and the elements of fertility added in the shape of commercial fertilizers.

If the clovers, cow peas, field peas, etc., are grown and plowed under, they will add a large quantity of nitrogen, having taken it from the air. This is a great gain, because nitrogen is the most costly ingredient of any manure. These crops also add that important element we call humus, which is decayed vegetation, and is one of the most valuable things put into the soil by stable manure.

If nitrogen is to be added in commercial form, which is often a very wise thing to do, there is no form in which it will act so quickly, and in which it may be had as cheaply as in nitrate of soda. This, however, should be put on shortly before it is expected to be taken up by the trees or plants; for it is very soluble and easily lost if not soon appropriated by the growing crop. It is well to make at least two applications in one season; one in the early part and one later, when the growth is almost at its height. It causes a remarkably vigorous growth.

Nitrate of soda should not be put on the land in the fall or winter, because it would be largely lost in the drainage water, before the time for the crops to use it.

Cotton seed meal, dried bone, fish scrap, and tankage, all have considerable proportions of nitrogen in them and are good manures, but they dissolve slowly and should be applied several weeks or months before they are expected to act on the crops.

Phosphoric acid is another necessary part of any complete manure, and should be used in growing soiling crops or directly upon the orchards, vineyards, berry fields, etc. It is found abundantly in bones and phosphate rock. The dissolved forms are more available than those which are merely ground or crushed. There is a small proportion of it in wood ashes.



Potash is the backbone of all fruit manures. It has a most wonderful effect on the fruits. It gives rich flavor and brilliant color to the fruit, and causes a sturdy growth of tree or plant. While it is the principal manurial element of wood ashes it is much more cheaply obtained in the various forms of potash salts than in commercial ashes. Muriate of potash is the cheapest of these, considering the content of available potash, which is 50 per cent, or a little more in some samples. Sulphate of potash is also very good, and so is kainit, but the latter only has about 12 to 14 per cent of potash in it. It is excellent for mixing with stable manure while the heaps are accumulating, for it absorbs much of the nitrogen, which would otherwise evaporate and be lost in the air. All of these forms of potash should be applied some weeks or months before they are expected to show their best effects on the crops. For fruit in particular, it is probably best to use sulphate of potash, exclusively as a source of potash, because the sulphate produces a better quality and more sweetness of the fruit, and its cost is not very much higher than that of muriate of potash.

Potash and phosphoric acid are never lost by evaporation or through drainage, but remain in the coarse manure with which they are mixed or in other forms, in the soil until taken up by the crops. Nitrogen is lost in both these ways and should be very wisely used. To use any or all of these fertilizers directly on fruit crops, or indirectly on them through soiling crops, which are finally plowed under, will be found to be very economical, and, therefore, profitable.

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### A LAW TO PROTECT BIRDS.

Editors Country Gentleman—The most important measure ever introduced in congress in the interest of game and bird protection passed the senate unanimously on May 18. It had previously passed the house with only 23 negative votes. I refer to what is known as the Lacey bird bill. This was introduced in the house by the Hon. John

F. Lacey of Iowa early in the session, and he has worked like a Trojan for it ever since. The League of American Sportsmen has also done stalwart work in the interest of the measure. Our 3,000 members, distributed throughout the entire United States have written and caused to be written thousands of letters to the members of the house and senate, imploring them to support this bill. Furthermore, our members have caused thousands of business men and farmers to write similar letters. It is safe to say that no measure introduced in congress in the last ten years has created so much popular interest all over the country, or has caused so great a flood of petitions from the people as the Lacey bill has.

Here are the provisions of the bill:

The first section enlarges the duties and the powers of the Agricultural Department to include the preservation, distribution, introduction and restoration of game birds and other wild birds. The Secretary of Agriculture is authorized to purchase such game and other wild birds, or their eggs, as may be required therefor, to propagate and distribute them over depleted areas where it may be possible for such birds to exist and thrive. For instance, prairie chickens may be imported from Nebraska and liberated in the Shenandoah Valley in Virginia, where, it is believed, they would prosper. The department would, in all such cases, prescribe rules prohibiting the killing of such birds from five to ten years, and the mere fact that the birds belong to Uncle Sam would inspire every man and boy with a wholesome respect for them. It is a well known fact that where game birds are liberated by wealthy clubs, many farmers' boys take a fiendish delight in killing them off; but not so with the birds known to be government wards.

The second section prohibits the importation into the United States of any foreign wild animal or birds, except under special permit from the Department of Agriculture. Special prohibition is laid upon the mongoose, the flying foxes, the starling, and other wild birds known to be injurious to agriculture and horticulture. If we had had such a law as this thirty years ago, the English sparrow would not to-day have been a public nuisance to the whole country.

The third section prohibits any common carrier from transporting from one state or territory to another the dead bodies or parts thereof of any wild animals or birds killed in violation of the laws of the state or territory in which the same were killed.

Section 4 provides that "all packages containing such dead animals, birds or parts thereof, when shipped by interstate commerce, as provided by section one of this act, shall be plainly and clearly marked, so that the name and address of the shipper and the nature of the contents may be readily ascertained on inspection of the outside of such packages."

Heavy penalties are provided for violation of either of these provisions.

Section 5 is specially important as regulating the traffic in foreign (extra-state) game, which is now carried on in New York and other large cities, and which enables any unscrupulous game dealer or hotel man or restaurant man to maintain a fence for the handling and sale of American game, killed or had in possession in violation of local laws.

Section 5 further provides "that all dead bodies or parts thereof of any wild game animals, or game or song birds, transported into any state or territory, or remaining therein for use, consumption, sale or storage therein, shall upon arrival in such state or territory be subject to the operation and effect of the laws of such state or territory, enacted in the exercise of its police powers, to the same extent and in the same manner as though such animals or birds had been produced in such state or territory, and shall not be exempt therefrom by reason of being introduced therein in original packages or otherwise."

## IMPORTANCE OF AIR-DRAINAGE.

To the Farmers' Review—When the fruit grower purposes planting an orchard he considers three things as of prime importance, first, that the land shall be good; second, that it shall be well under-drained, and third, that its situation shall be such that he can readily transport his produce to the market. But he frequently overlooks another factor the importance of which is most notable in valley areas. In these situations not only may the production of fruit be jeopardized, but the life of the trees themselves may be more or less precarious, and this even when the site is within the region influenced by a large body of water, such as a lake or a large river.

The advantages of a situation bordering a lake are manifold and are generally counted upon by fruit growers as a safeguard against the injurious effects of frost upon flower and leaf buds in the spring and upon maturing fruit, especially grapes, in the autumn. The action is simple. In the spring the water, being cold, is slow to become warm, and thus exercises a chilling effect upon the air of the neighborhood. It thus prevents the precocious opening of the buds. On the other hand, the water in the autumn, still warm with the remains of summer's heat, keeps the air warmer than it otherwise would be and thus frequently prevents a dangerous fall of temperature. This effect is also heightened by the presence of water vapor in the air, which, as it condenses as dew, gives off an immense quantity of latent heat—the heat required to keep the water in the form of vapor—that still further warms the air.

But this influence stops as soon as the water becomes frozen over, and as far as any helpful effect is concerned the lake or river might just as well not be there. The reason is clear. Water always occupies the depressions upon the surface of the earth, and the cold air being heavier than the warm drains into these places from higher ground just as water does. A simple way to prove this is to walk on a still night through some pocket in the land surface from which there is no

outlet. The temperature will be found to get lower and lower until the center is reached, and to gradually rise toward the margin on the other side. This change may often be noticed without the aid of any instrument.

Extended observation by several close students of nature goes to prove that even our so-called iron-clad trees that have in the beginning of their career borne good crops of fruit have annually become more feeble from exposure to extremes of cold, and have finally died after failing for one or more years to produce a crop. Therefore, in climates where low temperatures during the winter are of constant occurrence it is best to avoid these low lying districts, to select hill sites in preference and to place no dependence in the proximity of bodies of water unless they never, or at least, very rarely freeze over.

In this country there are perhaps no more striking examples of the gradual weakening of fruit trees from the rigors of winter than are offered by the states of Maine, New Hampshire and Vermont. In this region the upland, though at present offering much poorer facilities in the way of shipping, are proving more profitable in orchard crops than the low lands, the more certain yields more than offsetting the disadvantages due to the situations. Further, these regions can compete with the low lands, which have often the advantage of water transportation as well as that of rail. This is simply due to the crop's being more certain. The growers in the hills are also making another advance over the methods of their low land competitors. They are planting as extensively as possible of the choice varieties such as rank "fancy" in the leading markets. They have confidence that their northern-grown apples are surely making a place in the market; that the day is not far distant when these fruits will be the dominant apples of the large cities and that there will be no glut of first-class fruit of the choice varieties.

In choosing an orchard site be sure that the conditions for draining off the cold air are present and that conditions favoring the pouring in of cold air from higher levels are absent. This one factor may decide between profit and loss.—M. G. Kains.

## CARE OF NEWLY-SET ORCHARDS.

By E. F. Stephens, Nebraska.

Traveling during the past two weeks among our orchardists, and noticing the behavior of trees planted during the spring of 1900, we notice that the average farmer feels that this spring we have had more than the usual amount of rain-fall. We find the average planter busy with his farm crops, anxious to clean his corn. In some cases he has not yet cultivated his trees and plants planted during the spring of 1900 and on very many farms has not cultivated the older orchards. An examination of trees recently planted, shows that in many cases the soil moisture is nearly exhausted. In many orchards the weeds have been allowed to encroach upon the moisture that should have been reserved for the tree; or the soil has been crusted by heavy rains with subsequent rapid evaporation. In some orchards during the last two very hot days, trees which had leaved out and were putting out apparently sufficient growth suddenly wilted or the foliage shows signs of distress. Digging down, examination shows that these trees, just planted have not yet had time to establish a vigorous root growth, and that they are actually suffering from want of moisture. Correspondence and conversation with a large number of people indicates that trees and plants have started off under more favorable conditions than usual, and that if they can have needed and proper cultivation until the first of August, encouraging success will be secured. We find a very marked difference in the amount of work done on orchards already planted. Nearly all of our branch orchardists have already cultivated their plants and trees, four, five and six times, and with such work, trees and small fruit plants have put on a vigorous growth. The ground is well filled with moisture, the surface is clean and mellow, and the soil in condition to withstand six or eight weeks of dry weather. In some neighborhoods trees that have not received proper cultivation are in many cases checking growth that should be rapidly forming.

This season, in quite a number of places, we find leaves are wilting and showing suffering from lack of needed moisture. Recently I noticed thirty trees recently planted in grassy lawns that were doing so well that the planter thought they needed no further cultivation and yet the grass was encroaching upon the moisture needed by the trees to such an extent that one week more of this hot, dry weather would cause serious harm and would check the growth thus early in the season. In other yards we noticed that vegetables had been planted so near trees and plants recently set that rank-growing vegetables were rapidly absorbing the moisture needed for the trees, and the trees had been carefully planted and had maintained a fair growth until this time, would speedily suffer unless all vegetable growth within four feet of the tree, or a diameter of eight feet, was removed. The most effective mulch, is a soil mulch and this can be cheaply secured whenever trees and plants are in long rows; wherever trees and plants are so arranged that soil can not be worked, it is much better to trust to a mulch of fine manure, strawy litter, or anything that will shade the surface, than to depend upon hand labor to keep an eight-foot surface about each tree or plant, clean and mellow. It is so much easier and cheaper to give full cultivation as needed than to purchase a fresh lot of trees and plants to be used to refill during the coming spring. We are confident that the planter only needs to have his attention called to this to at once give needed care. We find trees suffering from another cause. Trees in nursery rows grow close together. They shade one another. When suddenly removed to open fields or gardens and exposed to the blistering sun and arid wind, the trees suffer precisely as a man's arm would suffer if he should remove his coat and roll up his sleeves—it would blister his arm within two hours. We regard it as an imperative that all trees recently planted, at least during the first season, should have the trunks protected by corn stalks, cloth, wooden veneers or even paper, and that care should be taken to loosen the string with which the protector is tied on as soon as pressure indicates danger of intercepting the free circulation of the sap.—*Prairie Farmer.*

INSECTS.

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NATURE STUDY IN THE DISTRICT SCHOOLS.

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By J. M. Stedman, Professor of Entomology in the Missouri State University.

Without discussing the advantages or the advisability of teaching nature study in our district schools, we will pass at once to note for a few moments the place that the subject of insects should occupy and the reasons why it should constitute a large share of nature studies in this grade of schools.

It will no doubt be admitted by all that the child naturally leans towards a special fondness for investigating, in his own way, the various objects of nature that he finds about him. The various problems in the struggle for existence, financial and otherwise, that are so prominent as they reached manhood and womanhood, never enter their minds. You will also, probably all agree, that, of the various objects of nature, those that are active and move, or have life, as the child calls it, attract the most attention, except, perhaps, the bright contrasting colorings of flowers, which in some cases are equally capable of attracting the child's attention.

Of the various objects that move and, therefore, attract attention, the insects constitute by far the greater number. Omitting the hundreds of small animals that the bulk of our people call insects, but that are not insects at all, such as spiders, ticks, granddaddy-longlegs, sowbugs, millipedes and the like, and confining ourselves to the true insects (Hexopoda), we will find that in a number of species, i. e., in a number of different kinds, the true insects constitute from three-fourths to four-fifths of all known species of animals, from the lowest Protozoan to the highest Mammal. Or, in other words, there are from three to four



times as many species of insects as there are of all other species of animals combined. But this is not all; while the insects are small in size in comparison with fishes, birds and mammals, they are immensely greater in number of individuals of each species, so that they more than make up in numbers what they lack in size. They are, in one form or another of their existence, to be found everywhere and at all seasons of the year. They are, as a class, easily obtained, reared and studied, and their life histories, wonderful transformations, adaptability to the various conditions of life, and their marvelous instincts and architectural habits, render them a continuous source for fruitful observation, which becomes a pleasure and recreation, and not a task; and which is especially suited to the development of that power of observation so lacking in most adult people, but so prominent in the youth, and which will lead to independent thought and research, and serve to make future life more happy and profitable.

But if wealth or financial gain be the object we are to attain in life, then I am not in a position to say that the study of insects will lead to a better insight into financial problems or cultivate observations of that nature—neither will any subject included in nature study. Still, it frequently happens, that upon the behavior of some of these small insects depends the financial success or failure of a great enterprise, and our material welfare is influenced much more than most people suppose by the actions of insects. It has, for instance, been carefully computed that in the United States alone, the average loss by the ravages of injurious insects on cultivated plants only, amounts to \$300,000,000 each year. One single species, the chinch-bug, caused a loss of \$60,000,000 in one year not long ago. And yet, all these estimates leave out of consideration the losses arising from the destruction of stored foods, clothing, injury to live stock, to say nothing of the annoyances to man or the carrying of disease. But, after all, we must not forget that many insects are beneficial as scavengers, fertilizers of plants, food for birds and other animals, as makers of silk and destroyers of injurious insects.

The study of insects is no small matter, and ample room is here found for intellectual growth; in fact, the field is so large, that no one

has yet been able to gain more than a mere smattering concerning it. Very little is yet known about the minute structure of insects; the life histories, transformations, and habits of the great bulk of insects have never been studied, really very few have yet been worked out, and the various relationships of the insects are not understood; and how much do we know about dimorphism, polymorphism, parasitism, the formation of galls, symbiosis and mimicry? Great pleasure as well as intellectual profit can be easily obtained by observing the various ways in which insects build their nests for themselves and for their young, how they unceasingly care for their offspring; their remarkable engineering feats, astonishing examples of foresight and displays of strength; their means of communication, their wars and even slavery.

Man is himself but a part of nature, and the wonder is that this subject of nature study has been so long neglected as a part of the education of our children. But the desire to know more of the creatures about us is now rapidly increasing, and this study is being introduced into our schools of all grades, to the great pleasure and delight of all who love out-of-door life, and desire to know more about their surroundings, the world of which they form a part, and of the laws governing life and inorganic nature.

But the average school teacher will ask, How can I best take up this study? What methods shall I employ? Where shall I look for material, and what is needed as accessories and guides?

In the first place, this study in the district schools can be conducted outside of regular school hours, or during a few hours on suitable occasions, such as when the children are restless some bright, warm afternoon, or on a half holiday, or on Saturday or Monday, as the case may be, when no regular school is held, and thus not in the least detract, but rather strengthen, their capacity for other studies. What child, boy especially, would not be at once interested and even enthusiastic when you let him know you are going to fish for insect life in a nearby pond, stream or ditch? Such places have an especial attraction for them. The children will be easily interested in this study if you will let them watch the habits and transformations of insects in the field, breeding

cages and aquaria; and this interest will be increased by directing them in the formation of a collection.

The child who finds pleasure in the collecting of birds' eggs and postage stamps will find more pleasure in collecting insects, and the collecting is only the first step towards learning something about them. Do not worry the children by requiring them to memorize abstract statements regarding insects; they get enough of that in the study of grammar, arithmetic and the like. Let all their knowledge be gained first hand by personal contact and observations on the specimens themselves, and thus develop the habit and desire to ascertain facts for themselves—independent thought and research—which is one of the most important points in favor of this study.

Use both the interrogation and the verification method, but only with the specimens before them. Teach the children the principal parts of an insect by comparing specimens from many different orders and by gross dissection, so that they will be able to recognize an insect and separate it from other groups of allied animals. Show them the ways the various parts of insects have been modified to fit them for the various modes of life, as, for example, the insect that catches its prey by running has different shaped legs from the one that jumps, or the one that swims in the water, or the one that burrows in the ground; that the mouth parts of the insect that eats holes in the leaves of some plant are different from the one that sucks the nectar from the flower. Note the different methods that insects employ to enable them to live under water. Fill a few glass fruit jars with water and place in them a few water plants, and the larvae and adults of all the different kinds of water insects you and the children collect. Catch a few larvae or caterpillars and place each species in a separate glass jar with a few leaves of the plant on which you found them feeding, and cover the opening with thin cloth. Allow the children to watch these aquaria and breeding jars, and observe the insects feed, moult, spin their cocoons and emerge as beautiful moths.

Take the glass out with you into the fields and woods, or along the road, lane and paths, and into the orchard or garden, or to the pond or stream. Look for insects on flowers and leaves, under stones and

pieces of wood, under the bark of fallen or decayed trees, in rotten stumps, and under logs, and in the creek under stones, and, if you have a net, sweep briskly the grass, weeds and bushes, and run the net through the water just skimming the mud of ponds and ditches.

The teacher should be supplied, first of all, with a good pair of eyes—nothing else is absolutely necessary; but, if possible, an inexpensive butterfly net that any boy can make, a cheap hand lens, a cyanide bottle for killing the insects not desired to keep alive, a paper of pins, a couple of cigar boxes, and a few glass fruit jars for aquaria and for rearing leaf feeding insects are all any teacher needs for district school work. The pupils need nothing in the way of apparatus; they are sure to have the sharp eyes.

Nature itself should be the only book for this grade of schools, and the teacher the only guide. And now, teacher, you should from the very start say, "I do not know," when such is the fact in regard to a question asked by the pupil, and add, if you will, "but we will try to find out," and you will soon learn that you will increase your store of knowledge in regard to insects as fast as, and perhaps faster, than your pupils, and at the same time you will cultivate a true scientific spirit in your students and in yourself.—Colman's Rural World.

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## THE AGRICULTURAL COLLEGE AND THE FARMER.

(A synopsis of the address delivered by Secretary Wilson at the Commencement of the Kansas State Agricultural College).

-The United States occupies the first place as a producing, manufacturing and commercial people. The interests that attach to these great industries justify the education of those who engage in them. We are concerned on this occasion with the education of the producer of the soil and the supervision of our mechanics. Eight hundred million dollars' worth of our exports during the last fiscal year were from

the soils of the country. Some of them represent hard work, unenlightened and unassisted by any of the discoveries of investigators of the age. They were produced by long days in the field and their prices brought few of the luxuries of life to the toilers who made the crops. They are staple crops with us, but they are raw material for the people beyond the seas who buy them from us. We boast of our free schools, but they do little to teach the man who works in the field or in the shop, with his coat off, regarding the soil he tills, the plants he cultivates, or the animals he rears, or the machine he makes. We have universities to which we look as the finished product of advanced learning, but they have not existed and do not exist to lighten the burdens of those who contribute to the grand total of the nation's exports, that keep the balance of trade in our favor and assure prosperity to our people generally. We pay more taxes for education than for all other purposes, but stop short of helping those of our people who pay most taxes and contribute most to all other classes—the giant millions with giant nerves and cool heads, the national reserve from which the national defenders come. Half of the nation is engaged in producing from the soil. Methods of cultivating have been improved so that the individual can produce more of this raw material for our own and foreign countries. Far-seeing, patriotic men have long recognized the necessity of educating the producing class. The physicist found that soils varied as the rocks from which they came varied; that the movement of moisture in soils was governed by laws; plants require certain elements without which they could not grow. Many of these processes are imperfectly understood at the present time. The gathering together of facts regarding the breeding of plants and animals led to the conclusion that nature operated through laws that are little understood. The ravages of insects suggested inquiry into their life and history. The microscope revealed a world of plants and animals working with man or against him. Progress in all these directions suggested that something might be done for the farmer. These and kindred questions presented themselves so persistently that provision has been made for the education of the producer from the soil in the several states. These colleges are new in our system of education, and new in the world. The federal

legislators, seeing the struggle that must soon take place between producers here and abroad, owing to the cheapening transportation and more rapid communication, provided for the education of the mechanic and the farmer. The wisdom of that step has been fully justified. The industrial colleges and experiment stations of our country are already far in advance of those of other countries. The new education for the farmer and mechanic teaches observation and trains toward experimentation. It is as comprehensive as the universe; it lays all sciences under tribute. The good work being done by college and experiment station is recognized by all classes of society. The Department of Agriculture is a clearing house for the colleges and stations of the several states with regard to their work. It is the aim of the department to encourage work that bears directly upon the requirements of the farmers of the country; to help in the solution of the problems that the farmer can not grapple with for want of time, training and apparatus. Our agricultural colleges are endeavoring to induce young farmers to avail themselves of the facilities offered to study the sciences relating to their work. How is the youth on the farm to know what things are most important? How does decaying vegetation become plant food? Why does clover enrich land more than bluegrass? Why should we harrow, and when should we use the roller? Where does the rain go that falls upon the ground? Why feed a milch cow different from a fattening steer? Why have some soils less plant food than others? Why does cotton seed kill hogs? Why do Americans send to Germany for potash? Why do smokers taste cotton seed fertilizers in a cigar? These things present themselves to a farm boy and without a correct answer he can not make a successful farmer. They were samples of questions which are presented to tens of thousands of farmers—some of them every day. Four years of study in our agricultural colleges will make these thousands of questions plain. Before any one can teach along these lines he must be a master. Education begins at the top, where specialists are aggregated. Common schools should prepare the students for the agricultural colleges. It was difficult to get the farmer to comprehend the value of this special education to himself and his children. It is difficult now. Many of our colleges have but

few students in strictly agricultural courses, where scientific study takes the place of dead languages and dry philosophy. Progress is being made, however. We shall soon have highly educated farmers fit to represent their fellows in deliberate assemblies; the American horizon is enlarging; our responsibilities are increasing. There is work to do as a people that we can not decline. No man lives for himself alone, we know; no nation lives for itself, we are learning. We should thoroughly understand the problems of production as they exist in our latitude, then we shall be prepared to take up what concerns the tropics. Our new responsibilities have no agricultural colleges nor experiment stations. No scientist ever studied the improvement of the coffee plant, for example, in those hot countries. Improved machinery has not replaced hand labor. Not only should the agricultural college see to the scientific education of the farm boy but the girl should receive scientific instruction regarding home duties. She should understand the laws of nutrition with regard to feeding human beings. She should know about bacteria and their work on meats and dairy products. She should learn how to balance a ration for a child, a growing boy, a working man, or an octogenarian. All these need not exclude music, art and literature. There is every reason why the colleges of agriculture should be encouraged. We live in an age of marked activity, and in the years of great prosperity. Educated men have charge of commerce and manufactures; our nation is famous for both, but both depend upon agriculture. There is a suggestive lesson for the farmer in everything he sees and hears; the songster in the grove tells us of a nestful of young birds to be fed with insects that prey upon his crops; the squirrel may fancy the newly planted seed, but depends upon the lower order of life that ravage his fields for a steady diet; the hawk may like a young chicken in spring, but preserves nature's balance in his dealings with other classes of destroyers; the duck and prairie chicken are fond of the potato bug. A yellow leaf on the potato vine hints at a worm in the root; a strange head of wheat in the field advises us that an insect carried pollen miles, perhaps, to produce the hybrid, and suggests to us new methods of procuring new varieties; the presence of water plants

admonish us to lay drain tile; a shower bakes the surface of the cultivated field and demands the immediate use of the light cultivator to prevent the loss of moisture. The herdsman knows the several calls of his breeding animals, and at once determines their requirements. The scant crop announces the lack of plant food of some kind. The spotted ear of the Leicester sheep speaks paragraphs, and the well-bred colt shows breeding in its earliest movements. The student of nature finds a laboratory wherever he may be—in the home, the market place, the forum or the sanctuary, the field or the forest.





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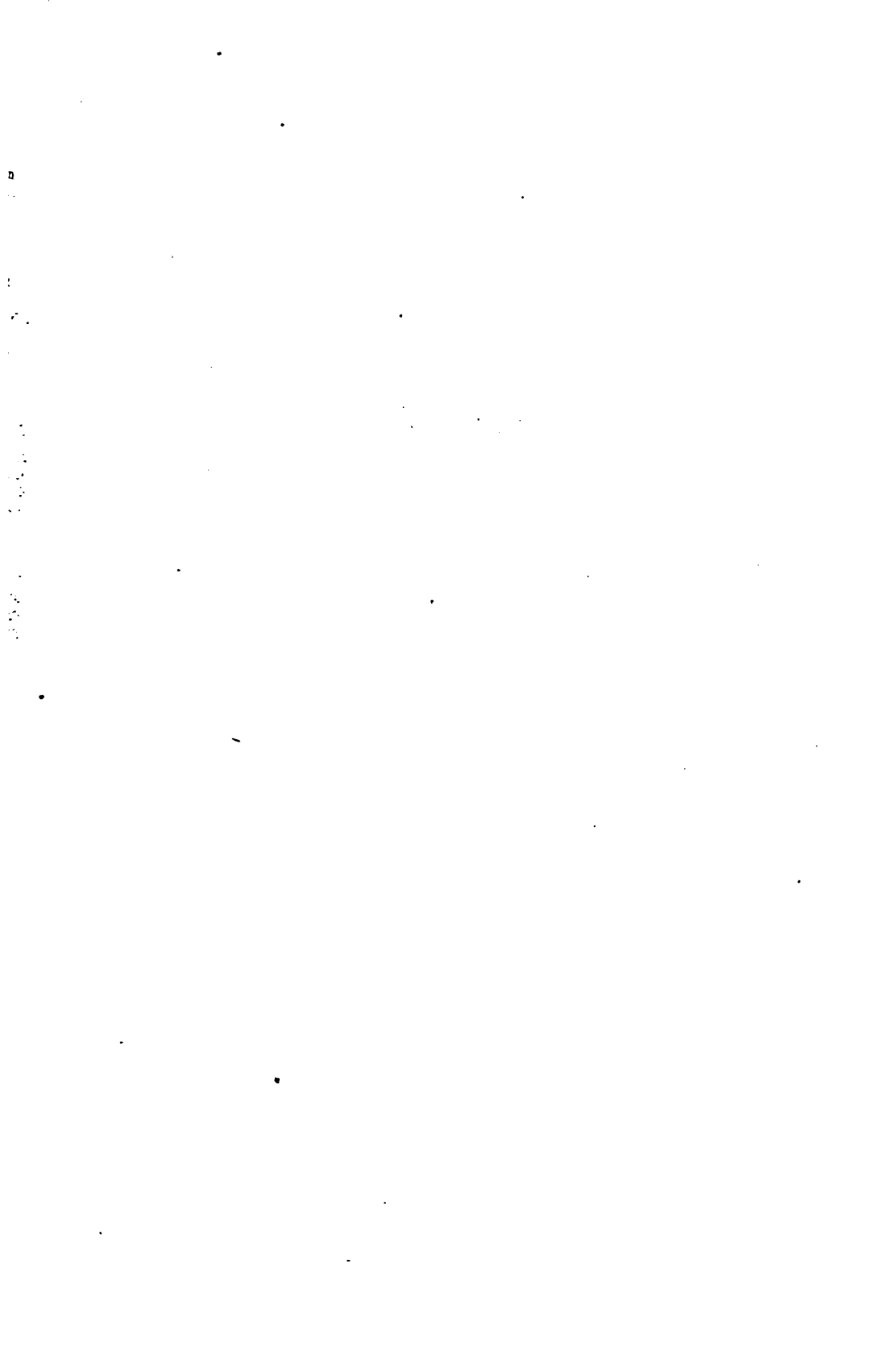
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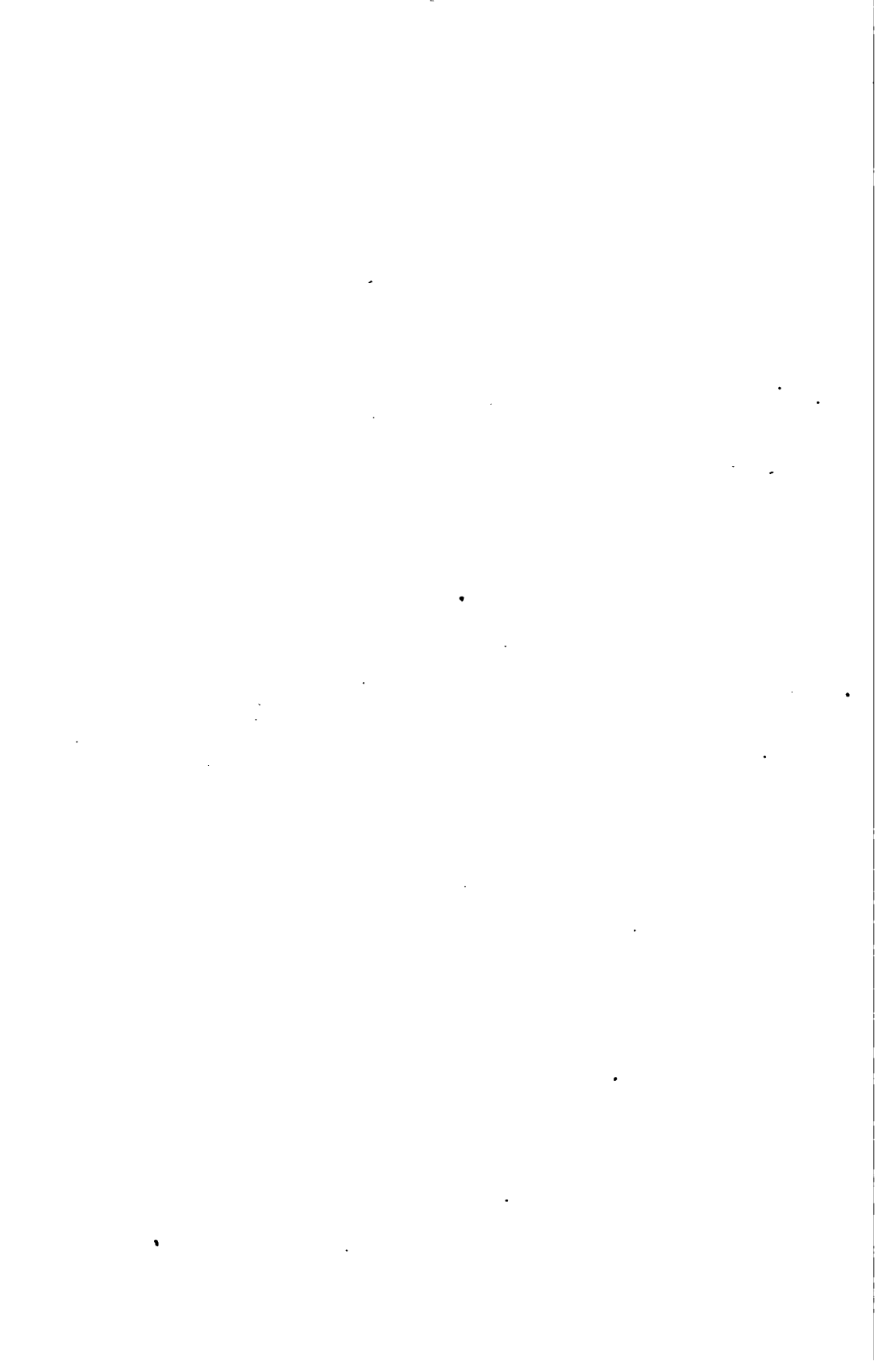
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